



ANNUAL RESIDENT FISH HATCHERIES REPORT

1994



IDFG 95-22

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RESIDENT FISH HATCHERIES 1994 ANNUAL REPORT

Resident fish hatcheries reared and stocked nearly 27 million fish weighing 1.26 million pounds. More than 2,500 stocking trips were made to plant fish in over 500 waters in the state.

Resident hatchery program costs were \$2.18 million for an average cost of \$1.73 per pound or \$0.08 per fish. Cost varied greatly between the hatcheries. Cabinet Gorge Hatchery had the lowest cost per fish at \$0.017 and American Falls Hatchery had the highest at \$0.41 per fish. This is due to the great diversity in the resident hatchery system goals. Cabinet Gorge produces fish during a 6-month growing season to produce an average 2-inch kokanee, and American Falls used the entire 12 months of fish production to produce an average 9-inch rainbow trout.

Rainbow trout of catchable size (8 to 11 inches) composed approximately one-half of the program costs at approximately \$1.1 million. This equates to a cost of approximately \$0.40 per fish stocked, while the fingerling production cost approximately \$2.65 per pound.

The Idaho Department of Fish and Game Engineering Bureau was kept busy developing contracts for asphalt paving jobs at Ashton and Hayspur hatcheries, and four new broodstock production ponds at Hayspur. All of these jobs were completed by independent contractors during 1994. The Engineering Bureau also accomplished pipeline work at Grace Hatchery, replaced the shop roof at Mackay Hatchery, and consulted on bird enclosure jobs at Hagerman and Nampa hatcheries.

Four captive broodstocks were maintained and spawned at the resident hatcheries producing over 15.5 million eggs for various resident programs. These stocks include Kamloops and rainbow trout maintained at Hayspur Hatchery, Colorado River rainbow at Ashton Hatchery, and westslope cutthroat trout at Clark Fork Hatchery.

**Idaho Department of Fish and Game
Resident Hatcheries Fish Production
01 /01 /94 - 12/31/94**

| Hatchery | Put-and-Take | | Put-Grow-and-Take | | Total pounds | Feed | | Feed conversion | Total cost | Cost/1,000 fish | Cost/pound |
|-----------------------|------------------|----------------|-------------------|----------------|------------------|------------------|----------------|-------------------------|--------------------|----------------------------|---------------------------|
| | Number | Pounds | Number | Pounds | | Pounds | Costs | | | | |
| Hagerman | 776,665 | 224,415 | 2,807,306 | 173,603 | 398,018 | 490,616 | 162,443 | 1.28 | 517,900 | 98.72 | 1.04 |
| Nampa | 308,023 | 146,978 | 793,065 | 55,014 | 201,992 | 220,544 | 72,340 | 1.09 | 258,010 | 234.32 | 1.28 |
| American Falls | 289,824 | 122,808 | 118,925 | 3,350 | 126,158 | 171,714 | 43,405 | 1.36 | 196,800 | 418.47 | 0.87 |
| Mackay | 139,140 | 70,028 | 4,007,734 | 47,494 | 117,521 | 119,872 | 39,435 | 1.02 | 213,205 | 51.40 | 1.81 |
| Grace | 466,687 | 70,156 | 915,511 | 48,885 | 119,041 | 130,391 | 42,530 | 1.1 | 183,650 | 133.00 | 1.54 |
| Hayspur | 427,128 | 100,353 | 588,446 | 34,476 | 134,829 | 204,936 | 56,114 | 1.51 | 189,400 | 186.49 | 1.40 |
| Ashton | 156,289 | 47,648 | 373,134 | 2,670 | 50,318 | 39,080 | 14,241 | 1.09 | 132,096 | 249.51 | 2.54 |
| Cabinet Gorge | 0 | 0 | 11,543,420 | 32,343 | 32,343 | 27,874 | 18,348 | 1.17 | 202,300 | 17.53 | 6.25 |
| Clark Fork | 115,819 | 44,001 | 1,896,312 | 8,685 | 52,686 | 76,820 | 30,702 | 1.45 | 163,000 | 81.00 | 3.09 |
| McCall | 0 | 0 | 97,261 | 449 | 449 | 992 | 0 ^a | 2.21 | 50,600 | 300.00 ^b | 2.44 ^b |
| Sandpoint | 0 | 0 | 852,638 | 7,620 | 7,620 | 7,219 | 4,157 | 0.95 | 53,700 | 62.98 | 7.05 |
| Clearwater | 160,256 | 23,782 | 0 | 0 | 23,782 | 39,550 | 9,897 | 1.66 | 22,851 | 142.59 | .96 |
| TOTAL PRODUCED | 2,839,831 | 850,169 | 23,993,755 | 414,589 | 1,264,757 | 1,529,608 | 493,612 | 1.21^c | \$2,183,512 | \$81.37^c | \$1.73^c |

^aLeftover chinook feed.

^bincludes redistribution of catchables.

^cDenotes weighted means.

Total cost for each hatchery is that hatchery's total budget minus capital outlay expenditures.

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

AMERICAN FALLS FISH HATCHERY

1994

**Gary Baker, Fish Hatchery Manager I
David Billman, Assistant Fish Hatchery Manager
Todd Garlie, Fish Culturist**

INTRODUCTION

American Falls Fish Hatchery is a resident fish hatchery located on approximately 120 acres of land owned by the Idaho Department of Fish and Game (IDFG) on the north bank of the Snake River, one-half mile below the American Falls Reservoir Dam. American Falls Hatchery is two miles by road from the town of American Falls.

The primary objective of the hatchery is to rear 150,000 pounds of catchable sized (9- to 12-inch) rainbow trout Oncorhynchus mykiss. American Falls Hatchery also produces fingerling (4- to 6-inch) rainbow trout as requested. The number and pounds of fingerling produced varies from year to year.

The hatchery is staffed by three permanent state employees. An eight-month temporary employee is hired for the planting season.

Funding for the hatchery operation comes from both license monies and from interest on an American Falls Irrigation District endowment.

The physical layout of the hatchery consists of 20 single pass 100 ft x 8 ft x 3 ft concrete raceways and a hatchery building containing 14, 21 ft x 4 ft x 2 ft concrete rearing vats.

Water for the hatchery comes from Reuger Springs located on the hatchery property. These springs flow an average of 20 cubic feet per second (cfs) at a constant water temperature of 55°F.

FISH PRODUCTION

American Falls Hatchery raised exclusively Hayspur strain rainbow trout for the 1994 production year. This strain of fish performs very well at this facility. The only problem is the timing of the egg supply.

Various state hatcheries received as transfers 119,970 catchable rainbow trout (41,100 pounds) from American Falls Hatchery (Appendix 1). American Falls Hatchery stocked 408,749 rainbow trout during this period. This includes fingerling rainbow. A total of 126,158 pounds of fish were stocked in area and state-wide waters (Appendix 2).

Costs for 1994 for various sizes of fish food were \$43,405.11. Production costs overall were \$0.87 per pound of fish produced, or \$0.30 per fish.

HATCHERY IMPROVEMENTS

- Various signs were repaired and repainted.
- New tile flooring was installed in residence 1.
- A new lawn tractor was purchased including, mower and front-end loader.
- An underground sprinkler system was installed on half of the lawn area by hatchery personnel.

HATCHERY NEEDS

- New metal roofs on two residences.
- Metal siding on the garage for residence 2.
- More underground sprinklers for the other half of the lawn area.
- New tile flooring in the crews quarters.
- New carpet in residence 3.
- New wood stove in residence 3.
- New electrical range in residences 2 and 3.

GENERAL

The 1994 season was marked by hotter and drier conditions than the previous two years. This resulted in some problems in late summer stocking due to very warm water in most of the streams and reservoirs in this area. Also, more time had to be spent on yard and grounds maintenance. Overall, things went well and we had no major problems.

Once again the fingerling rainbow developed coldwater disease about three weeks after they were moved outside into the large raceways. It seems that this is going to be an annual thing at this facility unless someone can come up with a

suitable vaccine. The outbreak this year was more severe than in previous years, and seemed to last even up until the fish were 9 to 10 inches long. More on this is included in the Fish Health Section.

PUBLIC RELATIONS

American Falls Hatchery received an estimated 5,000 visitors during this period. These consisted of public school groups from March through July. We also had scout groups, family reunions, bird watchers, drop-in visitors, hunters, and fishermen. Visitors were noted from nearly every state and various foreign countries. Two major media contacts were made by local television stations and newspapers.

ACKNOWLEDGEMENTS

Thanks goes to the staff Gary Baker, Fish Hatchery Manager I, David Billman, Assistant Fish Hatchery Manager, Todd Garlie, Fish Culturist, and Farren Porath, Biological Aide.

Appendix 1. Fish transfers, American Falls Hatchery, 1994.

| Facility | Number | Pounds | Size (#/lb) |
|---------------------|---------|--------|-------------|
| Clark Fork Hatchery | 59,200 | 17,600 | 3.36 |
| Mullan Hatchery | 35,520 | 13,800 | 2.57 |
| Ashton Hatchery | 9,890 | 4,300 | 2.30 |
| Grace Hatchery | 15,360 | 6,400 | 2.40 |
| Totals | 119,970 | 41,100 | 2.90 |

Appendix 2. Fish transferred or stocked by region.

| Region | Species | Number | Pounds | Destination |
|------------------------------------|-----------------|----------------------|---------|--|
| 1 | Hayspur rainbow | 94,720 | 31,400 | Region-wide |
| 2 | Hayspur rainbow | 0 | 0 | |
| 3 | Hayspur rainbow | 47,750 | 19,900 | Little Payette Lake Cascade Reservoir |
| 4 | Hayspur rainbow | 15,275 | 6,275 | Region-wide |
| 5 | Hayspur rainbow | ^a 202,557 | 48,408 | Region-wide |
| 6 | Hayspur rainbow | 48,447 | 20,175 | Region-wide |
| 7 | Hayspur rainbow | 0 | 0 | |
| Totals | | 408,749 | 126,158 | State-wide |
| ^a Includes fingerlings. | | | | |

Appendix 3. Fish feed used during the 1994 production year, American Falls Hatchery.

| Source | Size/type | Pounds | Cost |
|--------|-----------------|---------|-------------|
| Rangen | Starter | 88 | 64.69 |
| Rangen | 1/32 soft-moist | 352 | 235.65 |
| Rangen | 3/64 soft-moist | 528 | 336.23 |
| Rangen | 1/16 soft-moist | 396 | 239.90 |
| Rangen | 3/32 soft-moist | 440 | 252.91 |
| Rangen | 3/32 dry | 9,000 | 1,953.97 |
| Rangen | 3/32 medicated | 3,450 | 1,423.82 |
| Rangen | 1/8 bulk | 156,960 | 38,277.88 |
| Rangen | #3 medicated | 500 | 243.30 |
| Totals | | 171,714 | \$43,405.11 |

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

ASHTON FISH HATCHERY

1994

**Mel Sadecki, Fish Hatchery Manager I
Bill Harryman, Assistant Fish Hatchery Manager**

INTRODUCTION

Ashton Fish Hatchery is located in Fremont County, Idaho, approximately two miles southwest of the small community of Ashton. Constructed in 1920, and funded by fishing license dollars, Ashton Hatchery serves as a "specialty station," rearing nine species of trout and salmon, including rainbow trout Oncorhynchus mykiss, Colorado rainbow trout, rainbow x cutthroat hybrids, cutthroat trout O. clarki, brook trout Salvelinus fontinalis, brown trout Salmo trutta, golden trout O. aguabonita, Arctic grayling Thymallus arcticus, Kamloops rainbow trout, and Atlantic salmon Salmo salar.

The majority of fish produced at Ashton are fry and fingerling (1 to 6 inches) that are distributed throughout Idaho as part of various put-grow-and-take management programs. Catchable size fish (6 to 10 inches) are also reared at Ashton and distributed locally in waters managed on a put-and-take basis.

FISH PRODUCTION

General Overview

A total of 529,423 fish (50,318 pounds) were produced at Ashton Hatchery this year, consisting of 373,134 fingerlings (2,670 pounds) and 156,289 (includes holdovers) catchables (47,648 pounds). The total number produced was down from last year, as was the total pounds produced (Appendix 1). The majority of fish requests were met (golden trout and grayling requests were not met because eggs were unavailable). Production cost (excluding capital outlay) was \$132,096.42, with \$14,241.52 spent on fish feed, \$3,902.28 for transportation of fish, and the remaining \$113,952.62 spent on general hatchery operations and personnel cost. The average cost per pound of fish produced was \$2.54 (Appendix 1). The decrease in production resulted in an overall increase in the cost per pound and cost per fish produced.

All the fish reared at Ashton were received as eyed eggs (Appendix 2). Ashton was not able to produce enough catchables to meet regional needs, so it was necessary to bring in catchables from American Falls Hatchery.

All fry and fingerlings were fed by automatic belt feeders that dribbled feed into the tanks and raceways 8 to 10 hours per day. Human disturbance was kept to a minimum, and conversions improved over hand feeding techniques.

Demand feeders were utilized in outdoor raceways for the catchables. Conversion improved from 1.10 in 1993 to 1.09 in 1994 (Appendix 3). Waste settling areas were created in the lower 15% of the outside raceways, which served to settle fish waste for removal before it floated through the lower fish. Lights over nursery tanks were adjusted to a moderate intensity, and growth rates were maintained when the fish were moved outside by the use of automatic fry feeders and covers for the small raceways.

Kamloops had the lowest monthly length increase, while the catchable rainbow had the highest (Appendix 3).

The average survival for all fish was 62.9% from eyed egg to distribution. The Atlantic salmon had 23.6% survival due to poor quality eggs, and the brown trout had the best survival with 96.4% (Appendix 3).

Catchable Rainbows

Ashton Hatchery produced and stocked 71,892 (34,990 pounds) 10-inch catchable rainbow for distribution into area lakes and streams (Appendix 1). American Falls Hatchery transferred in 9,890 (4,300 pounds) catchable rainbow to meet regional requests. An additional 70,128 (7,378 pounds) of 6.4-inch holdovers were produced for stocking in 1995.

Water flows were down from 5.5 cubic feet per second (cfs) to 4.5 cfs during the spring months of heavy production. In order to maintain feeding rates for the catchables, supplemental oxygen had to be injected into the water. For this purpose, up to five Zeigler low head oxygen boxes were mounted behind raceway damboards, with all available water channeled through them. Pure oxygen was injected into the boxes, which increased dissolved oxygen concentrations by 1 to 5 ppm.

Colorado Rainbow Trout

A total of 6,698 eggs, taken from wild Colorado River rainbow, were received from Glenwood Springs Hatchery in May, from which 2,000, 2.7-inch fish are still on hand. In addition, there are 1,990, 7.7-inch and 1,539, 14.4-inch Colorado fish being held for broodstock in 1995 or 1996. A total of 3,379, 2.0-inch and 1,408, 12.5-inch Colorado rainbow trout were stocked in the Buffalo River in the autumn of 1994. Challis Springs, a tributary of the Salmon River, received 3,696 6.6-inch Colorado River rainbow. The fish stocked into Challis Springs all received right maxillary clips for identification.

Domestic Kamloops

Ririe Reservoir received 100,231 (349 lbs) Kamloops fingerlings from Ashton in 1994. Plants from 1994 averaged 2.1 inches in length.

Rainbow x Cutthroat Hybrids

Ashton Hatchery received approximately 10,000 hybrid eggs from Henrys Lake Hatchery in 1994. From those eggs, 10,124 fingerlings were stocked in Snow Creek and Hank's Ponds and the Fish Pond at Harriman State Park. There was obviously a slight error in enumeration of the eyed eggs, so the 101 % survival figure was not used in calculations for yearly survival averages.

Henrys Lake Cutthroat Trout

Henrys Lake shipped 10,000 cutthroat eggs to Ashton Hatchery in 1994. McCall Hatchery received 4,000 fingerlings from this lot in August, and the remaining 3,621 (14.2 lbs) fingerlings were planted in Sand Creek Pond #4 and Blue Creek Reservoir.

Brook Trout

In December 1993, Ashton Hatchery received nearly 300,000 brook trout eggs from Henrys Lake Hatchery for 1994 requests. An unidentified problem was responsible for the loss of nearly half of the fry. Despite heavy losses within the first month after swimup, 117,597 (1,842.5 lbs) fingerlings averaging 3.6 inches were stocked in October. The majority of these were destined for Henrys Lake, while the remainder were used to fill requests for other small waters in the Upper Snake Region.

Brown Trout

The brown trout raised at Ashton Hatchery during 1994 were received as eggs in November of 1993. Saratoga National Hatchery in Wyoming shipped 37,855 eyed

eggs, from which 36,507 (240.8 lbs) of 2.7-inch fingerlings were planted in the Henrys Fork at Stone Bridge and three tributaries of the Salt River in the Southeast Region.

Atlantic Salmon

For the past few years, Atlantic salmon have been reared at Ashton for release into Deadwood Reservoir as a kokanee predator. This year, the 3,495 (1,150 lbs) catchable sized Atlantic salmon released were divided between Deadwood Reservoir and Bull Trout Lake. In addition to the fish released, a small lot of the next year-class have been held over for release in 1995. This lot consists of 2,141 fish averaging 6.2 inches in length. No eggs were received in 1994.

Golden Trout

Golden trout are normally reared at Ashton primarily in an attempt to establish an Idaho spawning population at Baker Lake and for stocking several mountain lakes. No source of golden trout eggs could be located for 1994.

Arctic Grayling

Arctic grayling are normally reared at Ashton Hatchery for statewide mountain lake stocking; however, no source of grayling eggs could be located for 1994.

HATCHERY IMPROVEMENTS

Utah Power and Light Company gave Ashton Hatchery \$110,000 in 1992 for hatchery improvements and to rear 22,000 Hayspur rainbow trout yearly for stocking in Ashton Reservoir as mitigation for the Ashton Dam and power plant. This past year, the last of the initial money was spent to repair the hatchery entrance road and visitor parking area. The old asphalt surface was removed and the roadbed was widened to 20 feet and repaved. The specifications for the job did not include seal coating, which must be done to prevent frost damage to the surface.

New track and rollers were installed on the sliding doors of the quonset hut. The storage/loading rack for the pickup fish tank was reinforced, and residence #2 received exterior painting.

Projects scheduled for 1995 include repairing the settling pond outlet structure and an extension of the hatch house with additional fry vats.

Future needs include a new metal roof and siding for the three-car garage, painting the office/hatchery building, and construction of a large storage area and heated shop/garage east of the quonset hut.

FISH STOCKED AND TRANSFERRED

Ashton Hatchery's stocking program remained similar to last years program, with only minor changes (Appendix 4). The lack of golden trout and grayling eggs was the most obvious change. Numbers of catchable rainbow trout on station were not sufficient to meet requests, requiring us to transfer in 9,890 fish from American Falls Hatchery. The only fish transferred from Ashton Hatchery to another facility in 1994 were 4,000 cutthroat trout fingerling sent to McCall Hatchery. Ennis National Fish Hatchery provided 34 cull Kamloops brood fish, which were stocked into Island Park Reservoir.

FISH SPAWNING

The kokanee trap at Moose Creek was not installed this year. The numbers of fish in the spawning run was not expected to be very high, and Deadwood Reservoir has supplied enough eggs to meet demands. The 1992 Colorado River rainbow trout were checked for ripeness several times, but most females did not appear ready to spawn this year.

The crew made several trips to Henrys Lake to assist in sorting and spawning cutthroat trout, rainbow hybrids, and brook trout.

FISH FEED

A total of 39,080 pounds of fish feed were fed (Appendix 5) to produce 35,699 pounds of gain, for an average conversion of 1.09:1. All fish were initially fed BioDiet because of the superiority and performance of the feed. Catchable and holdover

rainbow were switched to less expensive Rangen's dry diet when they reached fingerling size, while other varieties were fed BioDiet until they were stocked.

PUBLIC RELATIONS

Approximately 4,000 people visited Ashton Hatchery this past year. About 1,500 elementary students from as far away as Idaho Falls visited the hatchery last spring, summer, and fall. Our visitor information center answers questions about the hatchery, fishing and hunting regulations, and various Idaho Department of Fish and Game policies. A color-coded map is designed to show where hatchery fish are stocked and lists reasons for limit changes in the Henrys Fork.

Fishing was again allowed in the hatchery settling pond for kids 12 and under on Free Fishing Day. The Forest Service provided signs and personnel to assist the hatchery crew in showing the kids how to fish. Upper Snake Region fishery personnel provided bait, hooks, bobbers, and fishing poles for the event, while conservation officers help teach ethics and laws to the kids. Area businesses provided hot dogs, buns, condiments, and soft drinks for participants. Ralph Moon, world renowned fly fisherman, gave lessons on fly tying and fly fishing. About 225 kids took advantage of free fishing and all caught fish. The average size of the fish caught was 2 pounds, with a few larger fish taken.

Fishing was also allowed on another weekend for physically and mentally handicapped kids. About 30 handicapped anglers took part in fishing, and everybody caught fish.

SPECIAL PROJECTS

Fish Marking

The 1993 year class Colorado River rainbow trout stocked into Challis Springs were right maxillary-clipped for future identification. Henrys Lake was planted with 114,597 brook trout, of which 13,000 were adipose-clipped.

Broodstock Hauling

Ashton Hatchery personnel were again involved in the mid-winter transport of broodstock culls from Ennis National Fish Hatchery. Ennis National Hatchery is primarily an egg taking facility, and excess spawners are hauled to lakes and rivers in Idaho. This year, 34 Kamloops (24 inches long) were transported to Island Park Reservoir in February.

Regional Efforts

Hatchery personnel assisted with firearms training for hunters education in Ashton and worked three days at the big game check station. Ashton personnel also ran the Free Fishing Day program here at the hatchery.

Appendix 1. Fish production and cost.

| Species | Size | No. Fish | Weight | Cost/lb | Cost/fish | Total cost |
|---|------|----------|----------|---------|-----------|------------|
| Fingerlings produced and stocked | | | | | | |
| Hayspur rainbow | 1.8 | 45,500 | 116.5 | 47.87 | .12 | 5,576 |
| Colorado rainbow | 2.0 | 3,379 | 10.9 | 38.81 | .12 | 423 |
| rainbow x cutthroat | 2.0 | 10,124 | 32 | 40.46 | .13 | 1,295 |
| Henry's Lake cutthroat | 2.0 | 3,621 | 14.2 | 31.59 | .12 | 449 |
| brown trout | 2.7 | 36,507 | 240.8 | 19.59 | .13 | 4,718 |
| brook trout | 3.6 | 117,597 | 1,842.5 | 8.99 | .14 | 16,576 |
| Kamloops rainbow | 2.1 | 100,231 | 349 | 35.99 | .12 | 12,563 |
| Total/average | | 316,959 | 2,605.9 | 15.96 | .13 | 41,600 |
| Holdover fingerlings | | | | | | |
| Colorado rainbow | 3.1 | 2,000 | 24 | 10.95 | .13 | 263 |
| rainbow trout | 1.2 | 50,175 | 33 | 184.91 | .12 | 6,102 |
| Totals/Average | | 52,175 | 57 | 111.66 | .12 | 6,365 |
| Catchables produced and stocked | | | | | | |
| Hayspur rainbow | 10.7 | 71,892 | 34,990 | 1.52 | .74 | 53,252 |
| Atlantic salmon | 9.4 | 3,495 | 1,150 | 1.82 | .60 | 2,095 |
| Colorado rainbow | 12.4 | 1,408 | 1,100 | 1.42 | 1.11 | 1,564 |
| Colorado rainbow | 6.6 | 3,696 | 440 | 2.27 | .27 | 1,000 |
| Totals/Average | | 80,491 | 37,680 | 1.54 | .72 | 57,911 |
| Fingerlings transferred to other hatcheries | | | | | | |
| Henry's Lake cutthroat | 1.7 | 4,000 | 7.6 | 64.09 | .12 | 487 |
| Totals/Average | | 4,000 | 7.6 | 64.09 | .12 | 487 |
| Catchables produced for 1995 | | | | | | |
| Atlantic salmon | 6.2 | 2,141 | 180 | 2.67 | .22 | 481 |
| Colorado rainbow | 15.0 | 1,539 | 2,052 | 1.36 | 1.82 | 2,801 |
| Colorado rainbow | 7.6 | 1,990 | 358 | 1.93 | .34 | 692 |
| Hayspur rainbow | 6.4 | 70,128 | 7,378 | 2.42 | .25 | 17,857 |
| Totals/Average | | 75,798 | 9,968 | 2.19 | .29 | 21,831 |
| GRAND TOTAL | | 529,4231 | 50,318.5 | 2.54 | .24 | \$128,194 |

Appendix 2. Eggs and fish received and transferred during 1994.

| Species | Eggs received | Fish received | Fish transferred | Destination |
|------------------------------------|----------------------|---------------|------------------|-------------|
| Kamloops rainbow | ^a 84,580 | 0 | 0 | |
| Hayspur rainbow | ^a 117,187 | 0 | 0 | |
| Colorado rainbow | 6,698 | 0 | 0 | |
| brown trout | ^a 74,510 | 0 | 0 | |
| brook trout | ^a 196,551 | 0 | 0 | |
| Henry's Lake cutthroat | 10,000 | 0 | 4,000 | McCall |
| rainbow x cutthroat | 10,000 | 0 | 0 | |
| Hayspur rainbow | 0 | 9,890 | 0 | |
| Total | 499,526 | 9,890 | 4,000 | |
| ^a For stocking in 1995. | | | | |

Appendix 3. Comparative growth rates, feed conversion, and percent survival for all species reared at Ashton Hatchery, 1994.

| Species | Average monthly length increase | Average conversion | Percent survival |
|-----------------------------|---------------------------------|--------------------|------------------|
| rainbow (catchables) | .567 | 1.00 | 51.2 |
| rainbow (fingerlings) | .498 | 1.04 | 67.5 |
| brook trout | .348 | 1.13 | 39.3 |
| brown trout | .354 | 0.81 | 96.4 |
| Kamloops | .267 | 0.81 | 86.6 |
| cutthroat | .390 | 1.38 | 76.2 |
| rainbow x cutthroat hybrids | .432 | 1.37 | 101.2 |
| Atlantic salmon | .510 | 1.22 | 23.6 |
| Holdover for 1995 stocking | | | |
| rainbow | .633 | 1.32 | |
| Atlantic salmon | .510 | 1.15 | |
| Colorado rainbow | .387 | 1.45 | |

Appendix 4. Origin of fish stocked or transferred in 1994.

| Species | Source | Eggs | Fish | Destination | Stocked | Transferred | Size (in) |
|--------------------------------------|----------------------|----------------------|-------|-----------------|---------|-------------|-----------|
| Kamloops rainbow | Ennis NFH | -- | 34 | Island Park | 34 | | 24 |
| Hayspur rainbow | American Falls | -- | 9,890 | Region 6 | 9,890 | | 10.2 |
| Hayspur rainbow | Hayspur | ^a 140,275 | -- | Region 6 | 71,892 | | 10.7 |
| Hayspur rainbow | Hayspur | ^a 90,128 | -- | Region 6 | 45,500 | | 2.0 |
| Kamloops rainbow | Hayspur | ^a 115,749 | -- | Ririe Reservoir | 100,231 | | 2.1 |
| Colorado rainbow | Glenwood Springs, CO | ^a 11,620 | -- | Buffalo River | 1,408 | | 12.4 |
| Colorado rainbow | Glenwood Springs, CO | ^a 17,916 | -- | Challis Springs | 3,696 | | 6.6 |
| Colorado rainbow | Glenwood Springs, CO | 6,698 | -- | Buffalo River | 3,379 | | 2.0 |
| brown trout | Saratoga NFH | ^a 37,855 | -- | Regions 5 and 6 | 36,507 | | 2.7 |
| brook trout | Henrys Lake | ^a 299,305 | -- | Henrys Lake | 117,597 | | 3.6 |
| Atlantic salmon | Wizard Falls, OR | ^a 4,970 | -- | Deadwood | 3,495 | | 9.4 |
| Henrys Lake cutthroat | Henrys Lake | 10,000 | -- | Region 6 | 3,621 | 4,000 | 2.0 |
| rainbow x cutthroat | Henrys Lake | 10,000 | -- | Region 6 | 10,124 | | 2.0 |
| Total stocked or transferred | | | | | 407,374 | 4,000 | |
| ^a Received prior to 1994. | | | | | | | |

Appendix 5. Feed use.

| Size | Source | Pounds | Cost/lb | Total cost |
|--------------|-------------|--------|---------|-------------|
| #1 moist | Bioproducts | 220 | 1.1917 | 262.19 |
| #2 moist | Bioproducts | 308 | 1.2065 | 371.61 |
| #3 moist | Bioproducts | 1,320 | 1.1699 | 1,544.31 |
| 1.3 moist | Bioproducts | 3,168 | .8420 | 2,667.50 |
| 2.5 moist | Bioproducts | 1,232 | .8708 | 1,072.86 |
| 4.0 moist | Bioproducts | 88 | .8814 | 77.56 |
| Medic. 4% TM | Bioproducts | 44 | 1.3877 | 61.06 |
| #3 dry | Rangens | 1,000 | .4433 | 443.30 |
| #4 dry | Rangens | 1,000 | .2949 | 294.90 |
| CC dry | Rangens | 2,000 | .2949 | 589.80 |
| 3/32 dry | Rangens | 1,800 | .2389 | 430.02 |
| 1/8 dry | Rangens | 26,900 | .2389 | 6,426.41 |
| Totals | | 39,080 | | \$14,241.52 |

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CABINET GORGE FISH HATCHERY

1994

**Bradford W. Dredge, Fish Hatchery Manager I
Bruce Thompson, Assistant Fish Hatchery Manager**

INTRODUCTION

Cabinet Gorge Hatchery is located on the south bank of the Clark Fork River in Bonner County, Idaho approximately eight miles southeast of the community of Clark Fork. The hatchery was constructed in 1985 and was co-funded by Washington Water Power, Bonneville Power Administration, and Idaho Department of Fish and Game (IDFG). The hatchery is operated by IDFG. The primary purpose for Cabinet Gorge Hatchery is to produce late-spawning kokanee salmon Oncorhynchus nerka kenneerlyi fry for release into Idaho's Lake Pend Oreille. Kokanee fry are needed to mitigate for the loss of wild kokanee recruitment caused by hydroelectric power projects in the Pend Oreille watershed. The kokanee fry release is timed to coincide with the altered cycles of zooplankton blooms in the lake caused by Mysis sp. shrimp.

The hatchery is staffed with two permanent employees. Thirty-three months of temporary labor are available for use during the year. Housing accommodations include two residences for the permanent staff and crew quarters for two temporary employees.

Water Supply

Cabinet Gorge Dam is located about one mile upstream from the hatchery. After its completion in 1952, artesian springs began appearing along the Clark Fork River at the present site of the hatchery. The hatchery water supply consists of approximately 4.2 cubic feet per second (cfs) from a spring and approximately 20 cfs from a well field. The temperatures of the lower spring and upper well field temperatures vary inversely with each other over a 12-month period. A mixture of the two water sources allowed incubation and feed training water to be kept around 50°F (range 47.5°F to 52.5°F). Production water ranged from 38.8°F to 52.4°F.

The hatchery utilizes six pumps to move the water to a common headbox. The lower spring and upper well field water serves the 31,000 cubic feet of rearing space in the hatchery building and the 1,500 cubic feet of space in the adult holding ponds.

Rearing Facilities

Rearing facilities at the hatchery include 192 upwelling incubators and 64 concrete raceways. The incubators are 12 inches in diameter by 24 inches high with a maximum capacity of 110,000 kokanee eggs each. The 64 concrete raceways have a rearing space of 31,000 cubic feet. Approximately one-third of each raceway is

enclosed by the hatchery building. The adult kokanee holding area consists of two holding ponds (10 ft x 30 ft each) at the head of the fish ladder. Additional adult holding is available in three holding ponds (10 ft x 30 ft each).

PRODUCTION

Between January 1, 1994 and December 31, 1994, Cabinet Gorge Hatchery produced a total of 11,543,420 fish weighing 32,343 pounds (Appendix 1). On December 31, 1994, a total of 16,613,806 Lake Pend Oreille kokanee Oncorhynchus nerka kennerlyi eggs and newly hatched fry were on hand (Appendix 2). An additional 1,003,673 rainbow trout O. mykiss sac fry were also on hand at the end of the year.

A total of 27,874 pounds of feed produced 23,783 pounds of gain for an overall feed conversion of 1.17. Total production cost (less capital outlay) was \$202,300, resulting in a cost per pound of fish of \$6.25, cost per inch of fish of \$0.0083, and \$17.53 per thousand fish (Appendix 1).

Lake Pend Oreille Kokanee

General Rearing

Fertilized eggs were brought to the hatchery building and disinfected in 100 ppm Argentyne for 15 minutes. After enumeration by volumetric displacement, the green eggs were placed into upwelling incubators and gently rolled until eye-up. At eye-up, the flows through the incubators were increased to maintain uniform egg rolling. Five days after hatch, the fry were sorted with slotted screens to separate infertile eggs and dead matter. Swim-up fry were allowed to swim out of the incubators into the raceways at 1,600 temperature units. Feed training began at 1,620 temperature units.

Kokanee were feed-trained at 50°F using Rangen's SoftMoist starter and Bioproducts BioDiet starter #2. After this initial feed training, the fish were reared on Bioproducts BioDiet Grower 1.0 to 1.3 mm pellet, depending on fish release size objectives. These size objectives have changed from about 1.3 fry inches (1986) when the hatchery began operations to the present request of 2 inches at release. To meet this request, the hatchery capacity has been reduced from 30 million to 16 million fry.

Because egg collection lasts over two months and a cross-section of the run is required for each release strategy, growth rates were adjusted according to release timing. The growth rates of the early egg-takes were slowed by decreasing the water temperature and the feeding rate. The late egg-takes growth were increased by raising the water temperature and the feeding rate. By adjusting these parameters after the fry are feed-trained, a representative sample can be obtained from each egg-take, thus assuring optimum genetic diversity in each release.

A total of 8,555,834 kokanee fry were produced at an average length of 1.95 inches and an average weight of 446.5 fish per pound. These fish gained 17,629.5 pounds from 19,511.5 pounds of feed, resulting in a conversion rate of 1.11:1.0. Fish feed production cost was \$0.729 per pound, \$0.00077 per inch, and \$1.50 per thousand.

Survival of green eggs to feeding fry was estimated at 86.5% (1992, 91%). Survival from first feeding to release was estimated at 97.3% (1992, 92%), resulting in survival from green egg to release of 84.1% (1992, 84%).

Fish Marking

No fish were marked this year due to lack of funding.

Fish Liberations

On June 10, 1994, 4,324,487 fish were released from the Cabinet Gorge Hatchery into the Clark Fork River. In mid-July, 4,231,347 kokanee fry were transported from Cabinet Gorge Hatchery and released into Sullivan Springs.

Numbers at release were based upon green egg inventory numbers minus mortality. All numbers were checked with a weight/sample count number as the fish were loaded onto the transport vehicles. All inventory numbers were within 0.2% of the weight/sample count numbers.

Kokanee were early imprinted with morpholine at 5×10^{-5} ppm for three weeks during incubation and early rearing. Artificial imprinting and attraction efforts were discontinued after March 7 because the proper INAD permits were not in place.

The Clark Fork River release group were liberated at night directly into the ladder via the fish bypass system. Only three raceways were released at one time. The entire release took less than two hours.

To facilitate rapid outmigration, the Cabinet Gorge Dam (WWP) cooperated by providing flushing water flows of 20,000 to 30,000 cfs during the release and for 8 to 12 hours thereafter.

The Sullivan Spring release group was transported in Idaho Department of Fish and Game (IDFG) tankers (3,000 gallon capacity). Loading densities of small fish in the tankers was kept below 0.60 pounds per gallon. Fish were planted below the bridge on the access road to the IDFG patrol cabin. Two tankers made up to two trips per day for 2.5 consecutive days to complete the plant. The nine releases occurred July 11-13, 1994.

Deadwood Kokanee

On January 1, 1994, there were 1,075,759 early-spawning kokanee from Deadwood Reservoir on station. Of these, 569,238 fry were released in selected lakes and reservoirs across Idaho. The released fish averaged 2.09 inches and 365.1 fish per pound.

Colorado Kokanee

On January 1, 1994, there were 922,024 late-spawning Colorado kokanee alevins from Blue Mesa Reservoir on station. Of these, a total of 813,938 fry survived to be released into Lucky Peak Reservoir, Spirit Lake, and various smaller lakes in the Panhandle region. The released fish averaged 1.66 inches and 729.3 fish per pound.

Hayspur Rainbow Trout

On January 4, 1994, there were 1,494,610 rainbow trout eyed eggs and alevins from Hayspur Hatchery on station. In May, 1,257,922 fry were transferred to Hagerman Hatchery. Clark Fork Hatchery received 125,311 fry. The fish averaged 1.65 inches and 554.4 fish per pound.

Harrison Lake Rainbow Trout

On January 4, 1994, 198,638 eyed eggs were received from Ennis National Fish Hatchery. In May, the surviving 156,539 fry were transferred to Hagerman Hatchery. The fish averaged 1.58 inches and 724.7 fish per pound.

BROODSTOCK MANAGEMENT

Lake Pend Oreille Kokanee Broodstock

In 1989, an experimental kokanee broodstock program was established at Cabinet Gorge Hatchery. These kokanee were reared as a captive broodstock to supplement declining kokanee populations in the lake. This program did not perform as anticipated. Bacterial Kidney Disease (BKD) was diagnosed in all broodstock year classes held at Cabinet Gorge Hatchery. These diagnostics have dropped the hatchery disease classification from Class A to Class C. The program was terminated in May 1994.

Brood Year 1990 Kokanee

There were 1,225 brood year 1990 kokanee remaining on January 1, 1994 following the 1993 spawning. None of these fish were held over to spawn in 1994. All fish were destroyed and disposed of.

Brood Year 1991 Kokanee

There were 21,561 brood year 1991 kokanee averaging 8.02 inches on station January 1, 1994. The mortality rate was extremely high (18.3% to date), with losses greater than 100 fish per day during the first weeks in January. In mid-January, these fish were sorted by hand to remove precocial and obvious diseased or deformed fish (7.5%). On May 26, 1994, a total of 6,768 survivors were disposed of at the Bonner County Landfill.

Brood Year 1992 Kokanee

There were 44,399 brood year kokanee averaging 5.2 inches on station January 1, 1994. Mortality rates during January were average (2.2% to date), with losses of less than 5 fish per day. By May, daily mortality rates had quadrupled (3.8% to date), with losses of greater than 20 fish per day. In early June, a total of 41,000 fish were planted in Brush, Smith, Hauser, and Lower Twin lakes. On June 30, 1994, the captive broodstock program at Cabinet Gorge Hatchery was terminated.

HATCHERY IMPROVEMENTS

Repairs and Improvements:

- The inside of residence #2 and crew quarters and both bathrooms in Residence #1 were painted.
- New wood stoves for residences #1 & #2 were purchased.
- New backup batteries for the generator were purchased and all generator coolant hoses were replaced.
- The hatchery received a used back-up generator from Cabinet Gorge Dam to back up the existing generator. It still needs to be installed.
- The incubator stands were renovated from wooden bench style to metal wall-mount hanging design. New incubator plumbing lines were installed.
- The existing dam boards were modified and new boards were purchased.
- A Jensorter eggpicker and counter was rented.

HATCHERY RECOMMENDATIONS

Inadequate amounts of available warm water (50°F) during the production months remains the limiting factor for fish production. Although the upper well field can yield up to 20 cfs, it is too cold during the production cycle. Warmer water from the lower springs must be added to temper the upper well field water. Unfortunately, only 4.4 cfs is available from the lower springs and only 19.4 cfs can be backed up by the generator should a power failure occur.

Other Species

All eggs received from out of state sources were certified disease-free. All fish eggs were disinfected in 100 ppm Argentyne for 15 minutes before entering the hatchery. All incubator jars were soaked in 100 ppm Argentyne for 15 minutes before re-use. All raceways were pressure cleaned then disinfected with 100 ppm chlorine before re-use.

FISH SPAWNING

Fish Trapping

The Clark Fork River fish trap was in operation from October 12 to the second week of January 1995. Kokanee began entering the trap immediately, and trapping and spawning continued through the end of December. There were 43,554 fish trapped. Spawntaking and mortality records indicated 33.5% of the spawning run was female (14,596).

The Sullivan Springs trap collected 116,767 fish. Of these, 8,120 were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records indicated a 30.1% female sex ratio on this fish run.

Spawntaking and Eggs Received

Clark Fork River kokanee spawntaking began on November 8 and continued to January 10, 1994. Spawntaking activities occurred from November 1, 1994 to January 6, 1995 at the Sullivan Springs fish trap.

A total of 14,803,653 kokanee eggs were collected during the 1994-1995 spawning season. Of those, 3,751,927 (1,059,648 in 1993) were obtained from 12,130 female kokanee at Cabinet Gorge Hatchery, and 11,051,726 (10,037,495 in 1993) were obtained from 32,698 female kokanee at the Sullivan Springs trap.

The hatchery received an additional 1,090,949 eyed rainbow and domestic Kamloop eggs from Hayspur Hatchery.

FISH FEED

The fish produced during 1994 were fed a total of 27,874 pounds of feed. All fish feed was acquired from state contract vendors, Rangen's, Inc., and Bioproducts. The overall conversion was 1.17 pounds of feed to produce 1 pound of fish, not including the weight of mortality (Appendix 2).

PUBLIC RELATIONS

Cabinet Gorge Hatchery is recognized by the surrounding communities as the major contributor of kokanee to the Lake Pend Oreille fishery. The importance of this lake fishery to the local economy is presently estimated at over five million dollars. The hatchery has been the focus of many radio, television, and newspaper stories in recent years. With the decline of kokanee numbers in recent years, even more attention is placed on the hatchery. Because of the popularity of the lake and its attractions, tourism is a booming business, and we get people from all over the world visiting the hatchery.

About 500 people signed our guest registration book this year. An estimated 3,000 visitors toured the hatchery during the 1994 season. In addition, numerous tours were given to school groups and other organized groups.

In addition to the tours, talks were given to various groups. We were on local/regional television programs, in the local newspapers, and in our regional newsletter.

SPECIAL STUDIES

Due to the increasing male to female ratios in late-spawning kokanee salmon, a feed experiment was performed from mid-May to early June. Prior to these experiments, it was speculated that the increased ratio of male to female was precipitated by high levels of testosterone in processed diets. The experiment involved feeding three diets to three production raceways of kokanee. The three diets were a Rangen's SemiMoist starter followed by BioDiet feed (production diet); a Rangen's SemiMoist feed; and a BioDiet feed. The designed experiment was replicated by Mike Casten at the University of Idaho Aquaculture Research Institute. However, a natural feed (brine/mysis shrimp) replaced hatchery production feed as one

of the test groups. In mid-July, random 60-fish samples from all groups were sent to the Sandpoint Hatchery for sex gender identification. The results of the sex gender analysis have not been calculated.

Feed experiment production data was collected on all of these fish. Cabinet Gorge Hatchery results indicated the straight Rangen's SemiMoist diet out-performed all other diets. To date, conversion rates were 1.07 (production diet), 0.84 (Rangen diet), and 1.16 (BioDiet diet). To date, percent mortalities were 8.1%, 8.4%, and 9.3%, respectively. Preliminary feed comparison results from the University of Idaho were similar.

ACKNOWLEDGMENTS

We would like to thank the Cabinet Gorge Dam personnel for their continued cooperation with hatchery operations. Thanks also to the Lake Pend Oreille Idaho Club, numerous volunteers, and various regional and hatchery Department personnel for their cooperation during the spawning season.

Appendix 1. Production summary, all species, 1994.

| Species | Number | Pounds | Length | Feed Fed | Feed Cost | Annual cost | Cost/lb of fish | Cost/1,000 fish | Cost/inch of fish | Conversion |
|---------------------------|------------|--------|--------|----------|-------------|-------------|-----------------|-----------------|-------------------|------------|
| Pend Oreille late kokanee | 8,555,834 | 19,162 | 1.95 | 19,512 | \$12,844.17 | \$141,611 | \$7.39 | \$16.55 | \$0.0085 | 1.11 |
| Colorado late kokanee | 813,938 | 1,116 | 1.66 | 1,164 | \$766.23 | \$8,448 | \$7.57 | \$10.38 | \$0.0063 | 1.22 |
| early kokanee | 569,238 | 1,559 | 2.09 | 2,577 | \$1,696.36 | \$18,703 | \$12.00 | \$32.86 | \$0.0157 | 1.88 |
| Hayspur rainbow | 1,383,233 | 2,495 | 1.65 | 1,772 | \$1,166.46 | \$12,861 | \$5.15 | \$9.30 | \$0.0056 | 0.88 |
| rainbow trout | 156,539 | 216 | 1.58 | 248 | \$163.25 | \$1,800 | \$8.33 | \$11.50 | \$0.0073 | 1.77 |
| Broodstock | | | | | | | | | | |
| 1990 late kokanee | 1,225 | 370 | 9.52 | 9 | \$5.92 | \$65 | \$0.18 | \$53.32 | \$0.0056 | N/A |
| 1991 late kokanee | 22,438 | 4,900 | 9.00 | 1,081 | \$711.59 | \$7,846 | \$1.60 | \$349.65 | \$0.0389 | 1.07 |
| 1992 late kokanee | 40,975 | 2,525 | 5.90 | 1,511 | \$994.65 | \$10,966 | \$4.34 | \$267.63 | \$0.0454 | 2.30 |
| Totals/ Average | 11,543,420 | 32,343 | 2.10 | 27,874 | \$18,348.63 | \$202,300 | \$6.25 | \$17,53 | \$0.0083 | 1.17 |

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Appendix 2. Lake Pend Oreille kokanee spawntaking summary, 1994.

| Spawntaking site | Total Fish | Females spawned | Green Eggs | Fecundity | Percent Females |
|--|------------|-----------------|------------|-----------|-----------------|
| Sullivan Springs | 116,767 | 32,698 | 12,536,635 | 383 | 30.10% |
| Cabinet Gorge | 43,554 | 12,130 | 4,077,171 | 336 | 33.51 % |
| Totals/Average | 160,321 | 44,828 | 16,613,806 | 371 | 31.07% |
| Includes male/female prespawn mortality. | | | | | |

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CLARK FORK FISH HATCHERY

1994

**John Thorpe, Fish Hatchery Manager II
Daniel Beers, Assistant Fish Hatchery Manager**

INTRODUCTION

The Clark Fork Hatchery is a resident species hatchery located on Spring Creek, 1.5 miles northwest of Clark Fork, Idaho. Approximately 10,000 westslope cutthroat trout Oncorhynchus clarki lewisi broodstock are held on station, providing the state's only captive source of westslope cutthroat eggs. In addition to westslope cutthroat, brook trout Salvelinus fontinalis, brown trout Salmo trutta, golden trout O. aguabonita, Kamloops rainbow trout O. mykiss, Arctic grayling Thymallus arcticus, and kokanee O. nerka kennerlyi are reared for distribution in the waters of the Panhandle Region. A target goal of 125,000 rainbow trout > 9 inches are distributed to the put-and-take fishery from March through October. For the 1994 plants, 54,172 of these trout were transported from production hatcheries in southern Idaho, and 61,647 fish were grown locally. Originally constructed by the Work Project Administration in 1934 and completed in 1938, the Clark Fork Hatchery is now funded for operation by Idaho Department of Fish and Game (IDFG) license fees. Water diverted from Spring Creek provides for incubation and rearing, with flows of 8-15 cubic feet per second (cfs) at temperatures averaging 41°F in winter and 48°F in summer. A well provides approximately 100 gallons per minute (gpm) of 45°F water to one bank of incubators. Unused well water can be diverted to fiberglass rearing troughs to mix with Spring Creek water. Rearing units include Heath incubator stacks, concrete and fiberglass early rearing vats, concrete raceways, and earthen broodstock ponds.

FISH PRODUCTION

Trout production at the Clark Fork Hatchery now addresses four different objectives; 1) maintenance of a captive westslope cutthroat broodstock of 15,000 adults to spawn at age 4 and 5 years, 2) production of 300,000 6-inch or greater westslope cutthroat for large lake stocking, 3) rearing westslope cutthroat and various other salmonid species to less than 3 inches for release in mountain and lowland lakes; and 4) rearing 140,000 rainbow trout for the put-and-take fishery in the Panhandle Region (Appendix 1). Eggs are collected on station (Appendix 2), as well as received from public and private sources.

The broodstock management plan had been altered over the past three years in an attempt to improve genetic purity. Broodstock from the Clark Fork strain westslope cutthroat, which carried 0.2% rainbow trout genes, had been replaced by genetically pure westslope cutthroat obtained from the Montana State Washoe Park Hatchery broodstock. These fish were reared from eggs at both the Cabinet Gorge and Sandpoint hatcheries prior to arrival at the Clark Fork Hatchery. Poor survival of the progeny from the Montana strain broodstock resulted in this plan being abandoned

in 1994. In 1994, broodstock replacements were once again taken from the Clark Fork strain 2-year-old fish. The average length of the broodstock population observed in 1994 was 11.8 inches (range 10.9-15.6 inches).

Although survival in the Montana strain fish was good when transferred to the Clark Fork Hatchery as fingerlings, survival of fry from Montana strain eggs taken on station has been very poor. Resistance to the Infectious Pancreatic Necrosis Virus (IPNV) found in the Spring Creek water supply was not well developed. Additionally, the offspring of the Montana source broodstock display a very high incidence of developmental abnormalities and a chronic dropout of deformed individuals during the first year of rearing.

During 1994, 174,265 (15,464 lbs) brood year 1992 6-inch plus westslope cutthroat were released in April. For the first time, 100,418 (4,980 lbs) brood year 1993 6-inch plus westslope cutthroat were stocked into Hayden Lake in September. Growth rates have been improved to produce the same 6-inch fish in 14 months rather than the former 21-month rearing period. During October, 79,906 (4,914 lbs) 5.6-inch brood year 1993 westslope cutthroat were transferred into net pens on Lake Pend Oreille for rearing to release in 1995.

The mountain lake stocking programs utilized domestic Kamloops, rainbow trout, and westslope cutthroat trout fry from brood year 1994. Lakes in the Panhandle and Clearwater regions received 44,405 (25 lbs) westslope cutthroat trout, 1,750 (3 lbs) domestic Kamloops, and 12,500 (20 lbs) rainbow trout. Lowland lakes were stocked with 33,273 (1,414 lbs) Henrys Lake brook trout. Lake Pend Oreille was stocked with 916,704 (1,342 lbs) kokanee grown from eggs collected at both Sullivan Springs and the Clark Fork River trap.

There were 115,819 (44,001 lbs) rainbow trout > 9 inches stocked or transferred by the Clark Fork Hatchery in 1994. Of these, 61,647 (21,731 lbs) trout were reared from eggs on station, while another 54,172 were transferred in from the American Falls Hatchery.

Annual costs to rear fish from Clark Fork Hatchery are listed in Appendix 3. Total cost to rear fish for 1994 was calculated by averaging the FY94 and FY95 budgets to obtain a cost for calendar year 1994. From that total, broodstock rearing, capital outlay, and fish distribution costs, as well as three months of Fish Culturist time (transferred to Cabinet Gorge Hatchery), were subtracted. The remaining cost was prorated for each species of fish reared to reflect the relative time involved in rearing.

HATCHERY IMPROVEMENTS

A major improvement to hatchery operations was the restoration of a scrapped PACO fish pump. Pumps that had been surveyed by the American Falls and Grace hatcheries were salvaged and hauled to the Clark Fork Hatchery. Over the past winter, hatchery personnel broke down and reassembled the pump, motor, and tower, as well as replaced all hoses. In March 1994, the pump was put back into service. It has not only reduced manpower needed for loading tankers, but has been put into service to mechanically grade the rainbow trout being reared for the put-and-take fishery. Total cost to rebuild and re hose the pump was less than \$500.00.

The water supply line from the east springs was excavated, cut, and capped. The line was originally constructed to provide additional spring water to the incubators and nursery tanks. Over the past 50 years, the wooden line deteriorated developing many leaks, and was most recently ripped out by the neighboring landowners. As a result, there was no back pressure from the spring box to direct water to the hatchery building. It was discovered that when the incubation well stopped working, the incubation and nursery line would drain down into the spring area. The cheapest solution was to cut that line and cap it to return the functionality of the gravity feed back-up from the city water pond.

The domestic water line to the public restroom was replaced. Upon examining the leak, it was determined that the pipe was so badly deteriorated that replacement was necessary. When completed, the project had included a 50-foot ditch, a tunnel under the hatchery shop slab floor, lots of new pipe, and installation of the Clark Fork Hatchery's first outdoor pressurized water hydrant.

The access bridge from the county road was modified to provide easier access for large trucks. Several trucks have torn out the guard rails or at least had to do substantial backing and filling to enter the hatchery prior to this modification. With the acquisition of a tractor and a bucket loader, the crew has been able to keep the roads and parking lot in much better shape this year, even with the reduced staffing.

Major construction needs include:

- A high priority requirement for a pump and piping to supply pathogen-free water for rearing broodstock, eggs, and fry. One well, with a tested flow of 1,000 gpm, was drilled and capped in 1989.
- Construction of concrete broodstock ponds to replace the earthen ponds now in use.

- The construction of a heated, weather tight garage for storage of vehicles and grounds maintenance equipment. The requirement for a covered area for vehicle maintenance still exists. At this time, repairs and modifications on truck-size vehicles must be performed out in the open without even a paved surface under the vehicle.

FISH STOCKED AND TRANSFERRED

The Clark Fork Hatchery program distributes fish in the Panhandle Region as directed by IDFG fishery management. The program includes distributing rainbow trout for put-and-take fisheries; distributing brown, brook, and cutthroat trout fingerlings for put-grow-and-take fisheries; distributing brook, cutthroat, golden, and Kamloops trout fry and grayling to remote sites; and redistributing warm and cool water game fish into Panhandle Region waters. During 1994, the Clark Fork Hatchery reared and released 916,709 kokanee fry into Lake Pend Oreille. These fish were part of a program to rear a portion of the Lake Pend Oreille stock remote from the Cabinet Gorge Hatchery.

Clark Fork Hatchery personnel stocked 115,819 (44,001 lbs) size 3 (> 9 inches) rainbow trout to waters of the Panhandle Region, north of Coeur d'Alene, from March to October, 1994. Of these, 54,172 (22,270 lbs) trout were received from the American Falls Hatchery. Another 61,647 (21,731 lbs) trout were reared from egg to release at the Clark Fork Hatchery and stocked to the put-and-take fishery. This completed a production level test for rearing rainbow trout > 9 inches at the Clark Fork Hatchery. This program will reduce the cost of transporting trout from southern Idaho production hatcheries and may provide a fish better prepared for north Idaho environment. Department pathologists noted that the rainbow trout raised at Clark Fork in 1994 were in the best condition and had the highest fin quality (75% of wild) of any they had inspected.

Releases of cutthroat, domestic Kamloops, and rainbow trout were delivered to 19 mountain lakes by backpack this year.

During October and November 1994, 79,906 brood year 1993 westslope cutthroat were transferred to net pens in Lake Pend Oreille for rearing to release in May 1994.

FISH SPAWNING

The Clark Fork Hatchery maintains a captive westslope cutthroat broodstock population to provide for needs within the Panhandle Region. Inability to maintain a disease-free population prevents transfer of eggs or fish to other regions. Presently,

approximately 10,000, 2- to 4-year-old brood fish are held to spawn in their fourth and fifth year. This provides a potential for taking 2 million green eggs, yielding from 1 to 1.5 million eyed eggs. During past years, the egg requirement has varied substantially. Fish requirements have ranged from over 1 million "button up" fry for nursery stream release to 150-350 thousand 2-year-old 6-inch fish for release in large lakes. To maintain a broad range of flexibility for fishery management staff, the broodstock population has been held to meet the high-end requirement. Excess fry are released, to comply with regional preference, when annual population analysis and stocking requirements have been completed.

During the 1994 spawning season, April 29 to June 17, 1994, 1,062,917 eggs were collected (Appendix 2.). Average fecundity of 1,880 females was 565 eggs/female. A saline diluent was utilized during fertilization, and buffered iodophor disinfection solutions were used to water-harden eggs. A 63% eye-up occurred, resulting in 670,925 eyed eggs, very close to the 1993 results.

FISH FEED

Normal production feeding utilizes Bioproducts, Inc. (Warrenton, Oregon) BioDiet starter and BioDry 4000 diet with ration quantity adjusted to growth on a daily basis. The feed projection program uses Haskell's formula with Delta L adjusted for expected monthly water temperature. Data on Spring Creek daily water temperature has been collected since 1980, and feed tests utilizing a variety of diets, feed delivery techniques, and rearing densities since 1989 have been utilized to institute the current program. Feed utilized and total cost during 1994 is found in Appendix 4.

PUBLIC RELATIONS

Public relations efforts in 1994 were similar to those of previous years with a high level of interaction with the public. There was more traffic this year, with approximately 5,000 visitors to the station. One of the warmest rain-free summers on record probably boosted visitor turn out. Hatchery personnel made an active effort to talk with as many of them as possible. As always, numerous tours were scheduled and provided to public and private schools, 4-H and FFA groups, as well as families. A visitor information pamphlet provides a summary of information to complement the visitor information center and has been well accepted by the public.

The hatchery staff attended public hearings and sportsmen's club meetings in an effort to get the Department's programs and policies out. The mountain lake stocking program was completed with cooperation from the Boundary County Backpackers and the Rocky Mountain Academy.

ACKNOWLEDGMENTS

We would like to thank the Boundary Backpackers Club, Rocky Mountain Academy, as well as Panhandle and Clearwater region personnel for packing fish to mountain lakes.

Thanks to the hatchery staff of Dan Beers and Bill Harryman and temporaries John Sufra and Mike Tetweiler.

Appendix A. Fish production at the Clark Fork Hatchery, January 1, 1994 to December 31, 1994.

| Species/Strain | Source | Beginning number | Beginning pounds | Ending number | Ending pounds | Number stocked | Pounds stocked | Destination |
|---------------------------|-----------------------------------|------------------|------------------|---------------|---------------|----------------|----------------|-----------------------------------|
| brook trout, BY92 | Henrys Lake | 16,614 | 706 | 0 | 0 | 15,326 | 989 | lowland lakes |
| brook trout, BY93 | Henrys Lake | 0 | 0 | 14,668 | 562 | 17,947 | 425 | lowland lakes |
| westslope cutthroat, BY89 | Montana | 1,240 | 1,771 | 0 | 0 | 0 | 0 | broodstock |
| westslope cutthroat, BY90 | Montana | 4,015 | 4,015 | 1,632 | 2,176 | 0 | 0 | broodstock |
| westslope cutthroat, BY91 | Clark Fork | 4,967 | 1,307 | 4,762 | 2,430 | 0 | 0 | broodstock |
| westslope cutthroat, BY92 | Clark Fork | 213,854 | 12,674 | 6,300 | 2,864 | 174,265 | 15,464 | Panhandle Region |
| westslope cutthroat, BY93 | Clark Fork | 200,527 | 996 | 15,176 | 1,428 | 148,401 | 8,354 | Hayden Lake, Lake Pend Oreille |
| westslope cutthroat, BY93 | Montana | 31,611 | 62 | 35,126 | 986 | 31,923 | 1,540 | Lake Pend Oreille, Mirror Lake |
| westslope cutthroat, BY94 | Clark Fork | 0 | 0 | 207,083 | 939 | 0 | 0 | Panhandle Region |
| westslope cutthroat, BY94 | Montana | 0 | 0 | 78,332 | 247 | 44,405 | 25 | mountain lakes |
| Kamloops rainbow, BY93 | Hayspur | 147,843 | 50 | 27,259 | 3,647 | 0 | 0 | put-and-take |
| Kamloops rainbow, BY94 | Hayspur | 0 | 0 | 119,808 | 38 | 1,750 | 3 | mountain lakes |
| kokanee, BY91 | Cabinet Gorge Sullivan Springs | 2,439 | 411 | 0 | 0 | 0 | 0 | research |
| kokanee, BY93 | Cabinet Gorge Clark Fork River | 0 | 0 | 0 | 0 | 336,805 | 522 | Lake Pend Oreille |
| kokanee, BY93 | Cabinet Gorge Sullivan Springs | 0 | 0 | 0 | 0 | 579,904 | 820 | Lake Pend Oreille |
| Hayspur rainbow, BY92 | Hayspur | 83,476 | 7,015 | 0 | 0 | 61,647 | 21,731 | put-and-take |
| Hayspur rainbow, BY93 | American Falls | 36,604 | 14,642 | 41,996 | 11,052 | 54,172 | 22,270 | put-and-take |
| Hayspur rainbow, BY93 | Hayspur | 0 | 0 | 118,629 | 13,810 | 0 | 0 | put-and-take |
| Hayspur rainbow, BY94 | Hayspur | 0 | 0 | 0 | 0 | 12,500 | 20 | mountain lakes |

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Appendix 2. Spawning summary, Clark Fork westslope cutthroat, January 1, 1994 to December 31, 1994.

| Stock | Females spawned | Number of eggs collected | Average fecundity | Percent eye-up | Eyed eggs |
|------------|-----------------|--------------------------|-------------------|----------------|-----------|
| Clark Fork | 1,328 | 537,685 | 405 | 54 | 289,489 |
| Montana | 552 | 525,232 | 952 | 73 | 381,436 |

Appendix 3. Cost of fish produced at the Clark Fork Hatchery, January 1, 1994 to December 31, 1994.

| Species | Numbers produced | Pounds produced | Cost to produce | Cost/1,000 | Cost/lb |
|---|------------------|-----------------|-----------------|------------|----------|
| Henry's Lake brook trout, 3-5 inches | 47,941 | 1,270 | \$12,000 | \$250.31 | \$9.45 |
| westslope cutthroat, BY92, >6 inches | 180,565 | 5,654 | \$23,000 | \$127.38 | \$4.07 |
| westslope cutthroat, BY93, 2-5 inches | 195,500 | 11,025 | \$45,000 | \$230.18 | \$4.08 |
| westslope cutthroat, BY94, <2 inches | 329,820 | 1,211 | \$23,000 | \$69.74 | \$18.99 |
| Cabinet Gorge, Sullivan Springs kokanee, BY93 | 916,709 | 1,342 | \$6,000 | \$6.55 | \$4.47 |
| Hayspur Kamloops, BY93 | 27,259 | 3,597 | \$6,000 | \$220.11 | \$1.66 |
| Hayspur Kamloops, BY94 | 121,558 | 41 | \$6,000 | \$49.36 | \$146.35 |
| Hayspur rainbow trout, BY92 | 61,647 | 14,716 | \$20,000 | \$324.45 | \$1.36 |
| Hayspur rainbow trout, BY93 | 118,629 | 13,810 | \$16,000 | \$134.87 | \$1.16 |
| Hayspur rainbow trout, BY94 | 12,500 | 20 | \$6,000 | \$480.00 | \$300.00 |
| Total | 2,012,131 | 52,686 | \$163,000 | \$81.00 | \$3.09 |

Appendix 4. Fish feed used in 1994 at the Clark Fork Hatchery.

| Size | Source | Pounds | Cost/lb | Total cost |
|----------------------|-------------|----------|---------|-------------|
| BioDiet starter #1 | Bioproducts | 575.9 | \$.97 | \$555.66 |
| BioDiet starter #2 | Bioproducts | 865.5 | \$.97 | \$842.69 |
| BioDiet starter #3 | Bioproducts | 1,229.4 | \$.98 | \$1,200.74 |
| BioDiet 1.0 mm | Bioproducts | 107.0 | \$.58 | \$61.83 |
| BioDiet brood 5.0 mm | Bioproducts | 543.7 | \$.63 | \$344.03 |
| BioDiet brood 6.0 mm | Bioproducts | 2,673.0 | \$.65 | \$1,729.63 |
| BioDry 4000 1.0 mm | Bioproducts | 838.2 | \$.60 | \$498.79 |
| BioDry 4000 1.3 mm | Bioproducts | 765.8 | \$.62 | \$474.45 |
| BioDry 4000 1.5 mm | Bioproducts | 6,066.5 | \$.54 | \$3,244.14 |
| BioDry 4000 2.5 mm | Bioproducts | 4,434.4 | \$.51 | \$2,307.33 |
| BioDry 4000 3.0 mm | Bioproducts | 14,074.2 | \$.51 | \$7,177.85 |
| BioDry 4000 4.0 mm | Bioproducts | 1,130.1 | \$.54 | \$613.08 |
| BioDry 4000 5.0 mm | Bioproducts | 545.1 | \$.64 | \$351.04 |
| BioDry 4000 6.0 mm | Bioproducts | 83.3 | \$.64 | \$53.65 |
| Rangen starter #3 | Rangen | 1,940.5 | \$.44 | \$860.08 |
| Rangen starter #4 | Rangen | 4,045.2 | \$.31 | \$1,255.27 |
| Rangen grower 3/32 | Rangen | 10,868 | \$.24 | \$2,596.51 |
| Rangen grower 1 /8 | Rangen | 2,314.6 | \$.25 | \$585.59 |
| Rangen grower 5/32 | Rangen | 10,549.9 | \$.25 | \$2,618.70 |
| Totals | | 76,820 | | \$30,702.89 |

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CLEARWATER FISH HATCHERY

1994

**Scott Patterson, Assistant Fish Hatchery Manager
Bob Turik, Fish Culturist**

INTRODUCTION

The Clearwater Hatchery is located in the community of Ahsahka in Clearwater County, Idaho. The hatchery was built by the Corps of Engineers under the U.S. Fish and Wildlife Service (USFWS) Lower Snake River Compensation Plan (LSRCP) and was completed in 1992. The hatchery is funded through the USFWS, who will also own the facility after construction is complete. The hatchery is operated by the Idaho Department of Fish and Game (IDFG).

The primary purpose for Clearwater Hatchery is mitigation for anadromous fish losses due to hydroelectric dams. Anadromous fish production has yet to reach full capacity; therefore, the facility can use excess rearing containers for rainbow trout production.

The IDFG funded the resident trout program with \$22,851.29 that included: operations (\$4,500), fish feed (\$9,896.69), and temporary labor (\$8,454.60). Permanent staff salaries (estimated at \$30,000) were funded by the LSRCP project.

The hatchery water source is a double pipeline from Dworshak Dam, which can supply over 60 cubic feet per second (cfs) of reservoir water to the facility. There are two intakes at the dam. The primary intake is adjustable (5 to 50 feet) to collect surface water, and the secondary intake is fixed about 200 feet below full pool level. This design allows mixing of water of different temperatures.

FISH PRODUCTION

Production in 1994 was 160,256 rainbow trout, 23,782 pounds (Appendix 1). All fish were liberated into the Clearwater Region waters.

The Clearwater Hatchery received 249,500 rainbow trout eyed eggs from Black Canyon Trout Farm between December 23, 1992 and January 14, 1993. Overall, 65% of these eggs survived to catchable size and weighed 62,182 pounds. Nearly 18% of the fish on hand January 1, 1994 were unaccounted for by December 31, 1994. Suspected causes of hidden loss include bird predation and enumeration errors.

No rainbow trout eggs were received for catchable plants in 1995 due to water supply maintenance scheduled for May 1995.

FISH FEED

A total of 39,550 pounds of feed was purchased during 1994 for the Black Canyon rainbow trout (Appendix 2). Feed sources include Rangen, Inc. (Buhl, Idaho) and Bioproducts (Warrenton, Oregon).

FISH STOCKED AND TRANSFERRED

The Clearwater Hatchery personnel stocked a total of 160,256 Black Canyon rainbow trout in streams and lakes in Clearwater Region during 1994. These fish were 2.58 fish per pound, weighed 62,182 pounds, and averaged 9.9 inches in length.

The stocking requests for Clearwater Hatchery were 150,900 fish. Although our program met 106.2% of this request, some flexibility in release dates, fish size, and numbers of fish released was added for successful stocking of 29 sites in 115 trips.

PUBLIC RELATIONS

The Clearwater Hatchery had visitors from "walk-in" tourists and a local Boy Scout unit. In addition, students from Cottonwood and Orofino elementary schools and Walla Walla Community College toured the hatchery.

Hatchery personnel gave presentations to the Kelly Creek Fly Casters and the Asotin and Orofino elementary schools. Presentations were made at the University of Idaho (Aquaculture class) and the Northwest Fish Culture Conference.

Television coverage was provided for the October release of rainbow trout in Spring Valley Reservoir. This release included large adult size fish, 2 to 3 pounds each.

SPECIAL PROJECTS

Multiple agencies (IDFG, Nez Perce Tribe, and the U.S. Forest Service) installed a permanent discharge tube at the Fenn Pond. The discharge tube has made planting much easier.

A total of 700 adult size fish, 2 to 3 pounds, was recovered from the settling ponds. The Clearwater crew supplemented 7 release sites in 17 trips with these large fish.

Appendix 1. Clearwater Hatchery resident fish production, January 1 through December 31, 1994.

| | Number | Weight | Feed Fed | Conver-sion | Cost/pound | Cost/1,000 fish |
|--|---------|--------|----------|-------------|------------|-----------------|
| Fish on hand: 1/1/94 | 195,800 | 38,400 | | | | |
| Fish/eggs received | 0 | 0 | | | | |
| Liberated | 160,256 | 62,182 | | | | |
| Fish on hand: 12/31/94 | 0 | 0 | | | | |
| Production | 160,256 | 23,782 | 39,550 | 1.66 | \$0.96 | \$142.59 |
| Estimated costs do not include permanent salaries. | | | | | | |

Appendix 2. Fish feed usage and costs for the Clearwater Hatchery catchable rainbow trout program, January 1 through December 31, 1994.

| Source | Formulation | Feed size | Pounds | Cost/pound | Total cost |
|-------------|------------------|-----------|---------|------------|------------|
| Rangen | Trout Grower | 1 /8 in | 1 1,720 | 0.2329 | 2,729.59 |
| Rangen | Trout Grower | 1 /8 in | 18,770 | 0.2329 | 4,371.53 |
| Rangen | Salmon Grower | 5/32 in | 4,060 | 0.2329 | 945.57 |
| Bioproducts | Trout BioDry 500 | 5.0 mm | 5,000 | 0.3700 | 1,850.00 |
| Totals | | | 39,550 | 0.2537 | 9,896.69 |

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
GRACE FISH HATCHERY
1994**

**Robert Hill, Fish Hatchery Manager I
Kurtis Schilling, Assistant Fish Hatchery Manager
Paul Martin, Fish Culturist**

INTRODUCTION

Grace Fish Hatchery is owned and operated by the Idaho Department of Fish and Game (IDFG) and is funded by license sales. The hatchery was constructed in 1946 and is located seven miles south of Grace, Idaho.

The objective of the hatchery is to produce catchable and fingerling rainbow trout Oncorhynchus mykiss for stocking primarily in Southeast Regional waters. The hatchery also produces several specialty species of trout of various sizes to meet statewide requests.

Middle and West Whiskey Creek springs are the water sources for the hatchery. The recent drought has caused about a 50% reduction in water flow from the springs. There is a natural fluctuation in water quantity basically opposite of that from run-off. Flows are at a minimum during May and June and peak in October and November. Water temperature is a constant 52°F.

Fish rearing space consists of 16 (3 ft x 1.5 ft x 13 ft) single pass hatchery building vats, 16 (4 ft x 3.5 ft x 40 ft) single pass small raceways, 4 (4 ft x 3.5 ft x 100 ft) single pass medium raceways, and 6 (14 ft x 2 ft x 300 ft) large raceways. The water for the large raceways is second use water from the vats and small and medium raceways that is mixed with fresh water from the middle spring. All hatchery water flows through a settling pond before being discharged into Whiskey Creek.

The hatchery is staffed with a Fish Hatchery Manager I, an Assistant Fish Hatchery Manager, and a Fish Culturist. Up to three temporary employees may be hired to assist with the various projects.

The operation of a fish trap on the Blackfoot River is also the hatchery's responsibility. The trap is located just upstream of the Highway 34 bridge, which is about one mile upstream of Blackfoot Reservoir. Operation of the trap occurs from early April through early June.

FISH PRODUCTION

Grace Hatchery began the 1994 calendar year with 509,554 fish weighing 31,064 pounds. During 1994, 1,144,000 eggs of various species were received. A total of 921,408 (118,320 lbs) fish were stocked out of the hatchery. At the end of the year there were 475,538 (38,115 lbs) fish and 474,000 sac-fry and eggs on the facility. This results in a total production of 1,396,946 fish and 119,041 pounds for the 1994 calendar year (Appendix 1).

In 1994, five species of trout were reared at Grace Hatchery. The Hayspur strain of rainbow trout accounted for the bulk of production. These fish were produced to fingerling and catchable size for stocking primarily into Southeast Regional waters. A large portion of these rainbow are stocked into seven reservoirs in the Southeast Region as part of a put-grow-and-take study which is comparing the return-to-the-creel of spring catchables verses fall fingerlings. The spring catchables are maxillary-clipped and fall fingerlings do not receive any mark. Fish production for this study concluded with the 1994 fall fingerling plant (Appendix 1).

Several shipments of eyed Hayspur rainbow trout eggs, totalling 929,000 eggs, were received from IDFG Hayspur Hatchery during the calendar year (Appendix 2).

The Kamloop rainbow produced at the hatchery were received from Hayspur Hatchery as eyed eggs in 1993. These were produced to catchable size and will not be completely planted out until early 1995 (Appendix 1).

Two groups of Bonneville cutthroat trout Oncorhynchus clarki utah, commonly known as Bear Lake cutthroat, were reared this year. They were received as eyed eggs from Egan Hatchery, Utah in 1993. The first group, lot 93-UT-05B, were adipose-clipped and planted as fingerlings into Blackfoot Reservoir to provide a cutthroat trout fishery. This may have been the last planting of Bear Lake cutthroat into Blackfoot Reservoir because of the concern for the dwindling population of endemic Yellowstone cutthroat trout O. clarki bouvieri. The remaining Bear Lake cutthroat were planted into Montpelier Reservoir and Little Valley Reservoir as subcatchables and were not marked (Appendix 1). No Bear Lake cutthroat eggs were received during 1994.

All of the brown trout Salmo trutta raised during 1994 were planted as fingerlings into Southeast Regional waters. They were received as eyed eggs in 1993 from Saratoga National Fish Hatchery in Wyoming and are the Plymouth Rock strain. Another 65,000 eyed eggs of the same strain were received in late November from Saratoga National Hatchery (Appendix 1 and 2). These fish will be stocked as fingerlings in 1995.

The remainder of our production consisted of rearing Henrys Lake cutthroat x rainbow hybrids. They were received as eyed eggs in 1993 from IDFG Henrys Lake Hatchery and were all planted into Southeast Regional waters as both subcatchables and catchables.

A total of 119,041 pounds of fish was produced from 130,391 pounds of food for a conversion of 1.1. Refer to Appendix 1 for a description of fish production for Grace Hatchery for 1994.

Total production cost was derived from 50% of both the 1994 and 1995 budgets, minus their respective capital outlay and annual feed cost. This was divided by twelve to represent each months cost. This was then multiplied by the percentage that each lot represented to total hatchery population, by numbers, for the months each lot was present. This was then totalled for each lot, and their portion of the annual feed cost was then added to give total production cost by lot (Appendix 3).

HATCHERY IMPROVEMENTS

The major construction project for 1994 was performed by IDFG engineering and construction crews. It consisted of tying the four water supply lines into the existing concrete collection basin adjacent to the medium raceway head ditch. This finished the previous job of replacing the open creek channel with a pipeline. The collection basin will be covered in 1995 to prevent growth of aquatic vegetation. The cover will also reduce stray fish habitat and eliminate the risk of injury.

The headraces of the medium and large raceways, and the medium raceway tailrace, were covered with panels of 2x6 inch lumber. The covers have done a tremendous job of eliminating growth of aquatic vegetation and making a less desirable habitat for stray fish and reducing their threat as a disease vector. These covers have also eliminated the risk of injury in these areas.

The condition of the main driveway has improved considerably since we now have a rear scraper blade for the Kubota tractor. A lot of the gravel had been graded off the driveway in the past, and will need to be replaced.

An air blower pump and air hose was purchased for the air bubble cleaning system on the large raceways. This system will be completed in the spring of 1995.

Needed projects include:

- Cover or bury the spring pond.
- Replace the large raceway headrace with a pipeline and controlling inlet valves to the raceways.
- Replace large raceways or recap concrete walls.
- Install an auxiliary water supply pipe from the main supply line to the small raceway header.

- Install a cleaning line on the medium raceways similar to that on the small raceways.
- Replace residence #1 and #3 domestic water lines.
- Paint all buildings.
- Install an air bubble cleaning system for the large raceways.
- Install baffles on the small and medium raceways.
- Install culverts and grade the driveway.
- Install steel siding on residence #2 and #3.

FISH STOCKED AND TRANSFERRED

Grace Hatchery was scheduled to produce and stock 1,148,430 fish in 1994 (Appendix 4). The hatchery actually planted a total of 1,321,408. Of this total, 400,000 walleye Stizostedion vitreum fry and 14,750 catchable rainbow were not produced at the hatchery. The walleye were received from Blind Pony Hatchery in Missouri and direct planted into Oneida Reservoir. The catchable rainbow were transferred from American Falls Hatchery. There were not any fish transferred out during the year. Refer to Appendix 1 and 4 for a description of fish stocked from Grace Hatchery in 1994.

A total of 167,818 catchables were originally requested and scheduled to be produced at Grace Hatchery. The Southeast Region Fisheries Manager edited this request to substitute 10,600 rainbow x cutthroat hybrid catchables for rainbows. A total of 187,039 catchables were stocked out of the hatchery. Of these, 40,180 were hybrids and 14,750 rainbow were transferred in from American Falls Hatchery.

Fall fingerling rainbow accounted for 382,357 of the total fish stocked. The original request of 202,612 fall fingerling for the seven study reservoirs in the Southeast Region was met. The excess fish planted were split between Blackfoot Reservoir and the Snake River just upstream from American Falls Reservoir. This excess was due to a reduction in catchable rainbow being requested for 1995. The rainbow are to be replaced with catchable hybrid cutthroat x rainbow.

The remaining fish planted were all fingerling brown trout, hybrid rainbow x cutthroat, and Bear Lake cutthroat trout. All requests were met or exceeded, except for an 11% shortfall of Bear Lake cutthroat.

FISH FEED

Rangens brand fish food was the only brand fed at the hatchery this year. A total of 110,702 pounds of Rangens Dry, at a cost of \$30,835, was fed mainly to the rainbow trout. A total of 19,689 pounds of Rangens SoftMoist, at a cost of \$1 1,695, was fed mainly to the specialty species produced at the hatchery. The grand total for 1994 was 130,391 pounds of food fed at a cost of \$42,530, and converting at 1.1 pounds of feed to produce 1 pound of fish (Appendix 5).

PUBLIC RELATIONS

The hatchery staff gave several scheduled tours to local area schools and numerous informal tours to interested general public visiting the facility.

Hatchery staff assisted with the Free Fishing Day clinics at Kelly Park Pond in Soda Springs and Dingle Gravel Pit near Montpelier.

SPECIAL PROJECTS

St. Charles Creek Trap

Administration of the St. Charles Creek trap was turned over to the Southeast Region fisheries staff this year. This was done because no eggs were to be taken at the facility. The hatchery staff installed the trap on April 25, 1994 and operated it for half the season. A total of 89 fish were trapped; 41 males and 48 females. Most of these fish were transported upstream and released at a few sites along the creek. Some were also released directly above the weir.

Blackfoot River Trap

The weir and trap were installed April 29 and operated until June 3 on the Blackfoot River. A total of 145 fish (63 males and 82 females) were trapped. Trap installation was delayed a week due to high water flows, which resulted in approximately 25 fish escaping upstream prior to installation.

Ten percent of the run was scheduled to be held for spawning. The progeny were to be planted into the Blackfoot River tributaries as unfed swim-up fry. A total of 41 fish were held; 15 males and 26 females. Water temperatures at the site were into the low seventies, and high mortalities resulted as experienced in past years. The decision to transport and release the surviving 12 fish to the upper narrows section of the Blackfoot River was reached on June 1. No eggs had been taken by this time. An alternative system needs to be adopted to reduce this negative impact. Two possibilities are to haul and hold spawners upstream, or pass all adults without taking any eggs.

Other trout species trapped at this facility are transported and released at locations other than the Blackfoot River. The suckers that were trapped were shipped by a commercial fisherman to Stoller Fisheries in Iowa and processed for human consumption. The numbers of other species trapped were as follows:

| | | | |
|---|---------------------|---------|----------------------|
| - | Rainbow trout | 21; | 12 males, 9 females |
| - | Rainbow x cutthroat | 16; | 8 males, 8 females |
| - | Bear Lake cutthroat | 28; | 18 males, 10 females |
| - | Suckers | 65 tons | |

Other

Ron Reardon went back to school at the University of Idaho for his Masters degree. Paul Martin replaced Ron as the Fish Culturist.

Appendix 1. Number and pounds of fish produced, stocked, food fed, and food cost at Grace Hatchery, 1994.

| Species/strain Lot # | Pounds on hand 01 /01 /94 | Number planted (pounds) | Pounds on hand 01 /01 /95 | Pounds produced (food fed) | Food Cost/ Conversion |
|--|---------------------------------|-------------------------------|---------------------------------|----------------------------------|--------------------------|
| Bear Lake cutthroat 93-UT-05A | 30,778 (947) | 24,142 (4,820) | 0 | 3,873 (3,806) | 2,248.58 0.98 |
| Bear Lake cutthroat 93-UT-05B | 235,351 (6,963) | 261,270 (22,700) | 0 | 15,737 (13,161) | 7,748.68 0.84 |
| rainbow x cutthroat 93-ID-RC | 49,253 (1,642) | 48,180 (8,148) | 0 | 6,506 (7,671) | 2,327.38 1.18 |
| Hayspur rainbow 93-ID-R9A | 23,294 (7,870) | 23,907 (9,816) | 0 | 1,946 (3,256) | 758.32 1.67 |
| Hayspur rainbow 93-ID-R9D | 84,195 (10,725) | 75,807 (22,129) | 0 | 11,404 (16,369) | 3,812.34 1.44 |
| Hayspur rainbow 93-ID-R9E | 23,679 (2,888) | 25,985 (10,488) | 0 | 7,600 (8,890) | 2,070.48 1.17 |
| Plymouth Rock brown trout 93-WY-BN | 63,004 (29) | 58,600 (1,730) | 0 | 1,701 (1,697) | 1,064.91 1.00 |
| Hayspur rainbow 93-ID-R91 | 60,000 (12) | 0 | 60,635 (11,025) | 11,013 (11,745) | 3,198.44 1.07 |
| Hayspur rainbow 93-ID-R92 | 320,000 (65) | 303,399 (24,823) | 0 | 24,758 (25,503) | 8,224.31 1.03 |
| Kamloops rainbow 93-ID-K1 | 41,000 (10) | 6,410 (2,239) | 26,616 (10,646) | 12,875 (15,412) | 3,946.25 1.20 |
| Hayspur rainbow ^a 94-ID-R91 | 300,000 (60) | 78,960 (5,300) | 144,225 (16,205) | 21,445 (22,686) | 7,057.42 1.06 |
| Hayspur rainbow ^a 94-ID-R92 | 280,000 (56) | 0 | 244,062 (239) | 183 (195) | 86.58 1.07 |
| Hayspur rainbow ^b Trnfr AmF | 15,360 (6,400) | 14,750 (6,127) | 0 | 0 | 0 |
| Totals | 1,510,554 (31,267) | 921,408 (118,320) | 475,538 (38,115) | 119,041 (130,391) | 42,543.69 1.1 |
| ^a Received as eggs after 1-1-94. | | | | | |
| ^b Transfer from American Falls; only included in number and weight planted. | | | | | |

Appendix 2. Eyed eggs received at Grace Hatchery, 1994.

| Species/Strain | Source | Number Received | Date Received |
|-----------------------------|------------------------|-----------------|---------------|
| Hayspur rainbow | IDFG Hayspur | 103,000 | 02-08-94 |
| Hayspur rainbow | IDFG Hayspur | 55,000 | 02-13-94 |
| Hayspur rainbow | IDFG Hayspur | 115,000 | 02-15-94 |
| Hayspur rainbow | IDFG Hayspur | 26,000 | 02-18-94 |
| Hayspur rainbow | IDFG Hayspur | 95,000 | 02-22-94 |
| Hayspur rainbow | IDFG Hayspur | 280,000 | 11-09-94 |
| Lewis Lake lake trout | Wyoming Story Hatchery | 75,000 | 11-16-94 |
| Plymouth Rock brown trout | Saratoga NFH | 65,000 | 12-01-94 |
| Jenny Lake/Soda Lake splake | Wyoming Story Hatchery | 75,000 | 12-07-94 |
| Hayspur rainbow | IDFG Hayspur | 105,000 | 12-08-94 |
| Hayspur rainbow | IDFG Hayspur | 150,000 | 12-21-94 |
| Total | | 1,144,000 | |

Appendix 3. Fish production costs, 1994.

| Species | Size inches | Number produced | Pounds produced | Production cost | Cost/1,000 | Cost/lb |
|---|-------------------------|-----------------|-----------------|-----------------|------------|---------|
| Bear Lake cutthroat | P+T 9 ^a | 24,142 | 3,873 | 3,766 | 156 | 0.97 |
| Bear Lake cutthroat | PG +T 6 | 261,270 | 15,737 | 16,179 | 62 | 1.03 |
| rainbow x cutthroat | PG+T 6 + 9 ^b | 48,180 | 6,506 | 5,843 | 121 | 0.90 |
| catchable rainbow | P+T 10 | 125,699 | 20,950 | 12,956 | 103 | 0.62 |
| Kamloops rainbow ^c | P+T 10 | 33,026 | 12,875 | 12,330 | 373 | 0.96 |
| brown trout | PG +T 4 | 58,600 | 1,701 | 4,111 | 70 | 2.42 |
| rainbow | PG +T 6 | 303,399 | 24,758 | 47,440 | 156 | 1.92 |
| rainbow ^c | P+T 10 | 283,820 | 32,458 | 74,906 | 264 | 2.31 |
| rainbow ^c | PG +T 6 | 244,062 | 183 | 6,119 | 25 | 33.4 |
| Totals | | 1,382,198 | 119,041 | 183,650 | 133 | 1.54 |
| ^a P+T denotes put-and-take. ^b PG +T denotes put-grow-and-take. ^c Size at 12-31-94; production not completed. | | | | | | |

Appendix 4. Fish requested and produced at Grace Hatchery, 1994.

| Species | Number requested | Number produced | % achieved |
|---|----------------------|----------------------|------------|
| catchable rainbow | ^a 167,818 | 146,859 | 87% |
| fingerling rainbow | 202,612 | 382,357 | 188% |
| catchable rainbow x cutthroat | 10,600 | ^a 40,180 | 379% |
| fingerling rainbow x cutthroat | 8,000 | 8,000 | 100% |
| fingerling Bear Lake cutthroat | 318,400 | 285,412 | 89% |
| fingerling brown trout | 41,000 | 58,600 | 143% |
| Subtotals | 748,430 | 921,408 | 123% |
| Walleye | 400,000 | ^b 400,000 | 100% |
| Totals | 1,148,430 | 1,321,408 | 115% |
| ^a Original request was for rainbow catchable but was switched to rainbow x cutthroat hybrid catchable as per request of Regional Fish Manager. ^b Fish were direct planted from Salt Lake City Airport to Oneida Reservoir. | | | |

Appendix 5. Fish feed used and cost, Grace Hatchery, 1994.

| Manufacturer | Diet | Size | Cost/lb | Pounds fed | Cost |
|--------------|-----------|---------------------|---------|------------|-------------|
| Rangens | Dry | Starter | 0.4440 | 609 | 270 |
| Rangens | Dry | # 1 | 0.4440 | 826 | 366 |
| Rangens | Dry | # 2 | 0.4440 | 2,200 | 978 |
| Rangens | Dry | # 3 | 0.4440 | 4,550 | 2,020 |
| Rangens | Dry | # 4 | 0.2978 | 7,350 | 2,188 |
| Rangens | Dry | # 4 Medicated | 0.4866 | 1,800 | 876 |
| Rangens | Dry | Coarse Crumble | 0.2949 | 11,750 | 3,465 |
| Rangens | Dry | Coarse Crumble Bulk | 0.2889 | 29,710 | 8,583 |
| Rangens | Dry | 1/8 Bulk | 0.2329 | 45,707 | 10,645 |
| Rangens | Dry | 5/32 Bulk | 0.2329 | 6,200 | 1,444 |
| Subtotals | Dry | | | 110,702 | \$30,835 |
| Rangens | SoftMoist | Starter | 0.7402 | 21 | 16 |
| Rangens | SoftMoist | 1/32 in | 0.6804 | 132 | 90 |
| Rangens | SoftMoist | 3/64 in | 0.6506 | 352 | 229 |
| Rangens | SoftMoist | 1/16 in | 0.6207 | 880 | 546 |
| Rangens | SoftMoist | 3/32 in | 0.5908 | 1,100 | 650 |
| Rangens | SoftMoist | 1/8 in | 0.5908 | 17,204 | 10,164 |
| Subtotals | SoftMoise | | | 19,689 | \$11,695 |
| Totals | all diets | | | 130,391 | \$42,530.58 |

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
HAGERMAN FISH HATCHERY
1994**

Joe Chapman, Fish Hatchery Manager II

INTRODUCTION

Hagerman Fish Hatchery is a state-owned resident trout production facility. The hatchery raises several strains of rainbow trout Oncorhynchus mykiss and various specialty species for statewide distribution. Hagerman Hatchery is the Idaho Department of Fish and Game's (IDFG) largest resident trout production facility. Built in 1947, it is located approximately 30 miles west of Twin Falls on the Snake River.

Funding is provided through IDFG license money. There was approximately \$427,900.00 from Hagerman's budget and approximately \$90,000.00 from the fish transportation budget used to rear and plant fish in the 1994 production year, not including capital outlay expenditures (Appendix 1).

The hatchery is staffed with four permanent employees and two permanent transport operators. Twenty months of temporary labor are available for use during the year. Personnel changes this year included a new Hatchery Manager, Joe Chapman, who replaced Tom Frew after he was promoted to Resident Hatcheries Supervisor; and Dave Costas, the new Fish Culturist who replaced Dave May after he was promoted to Assistant Manager at Magic Valley Hatchery.

The hatchery water supply consists of approximately 42 cubic feet per second (cfs) from Tucker Springs and approximately 61 cfs from Riley Creek, although the quantity fluctuates seasonally. The Tucker Springs water serves the 2,045 cubic feet of rearing space in the hatchery building, 10,530 cubic feet of rearing space in the fingerling ponds, and up to 118,560 cubic feet of rearing space in the large production raceways. Riley Creek water supplies the 287,280 cubic feet of rearing space available in 12 additional raceways. The Tucker Springs water is a constant 59°F year-around, and Riley Creek fluctuates from 52°F to 67°F on an annual basis.

HATCHERY PRODUCTION

Hagerman Hatchery produced a total of 5,246,113 fish weighing 382,705 pounds during 1994. Of these, 3,583,971 were reared and planted in Idaho's waters, of which 776,665 were planted 8 inches long and larger, and 2,807,306 were planted smaller than 8 inches long (Appendices 1 and 2). About 45% of the total fish planted were stocked in Region 4 waters (Appendix 2). The larger fish were rainbow trout, Kamloops rainbow trout of various strains, rainbow x cutthroat hybrids, and a Kamloops x steelhead hybrid; while the 3- to 8-inch fish consisted of rainbow trout, Kamloops trout, Kamloops x steelhead hybrids, and cutthroat x rainbow hybrids (Appendix 3). In addition to the requests from the regions, 27,480 rainbow trout weighing 3,200 pounds, that were donated by Clear Springs Trout Company, were

stocked into American Falls Reservoir on November 3, 1994. An additional 1,686 fish weighing 9,207 pounds (average 5.5 lbs each) were hauled from Ennis National Fish Hatchery and stocked into Idaho waters. This program has been very successful with Idaho anglers.

The 398,018 pounds planted included 224,415 pounds of put-and-take fish averaging 9.0 inches that were planted in state waters, and 173,603 pounds of fingerlings that averaged 5.15 inches were planted. The cost of planting the average 9.0 fish per pound (6.3 inches) was approximately \$0.97 per pound, or \$107.91 per 1,000 fish, or \$0.0192 (1.92 cents) per inch (Appendix 1).

In addition to the fish reared and planted, an additional 1,662,142 fish weighing 101,421 pounds were on hand at the hatchery on December 31, 1994. These were comprised of 95,142 fish weighing 24,650 pounds (average 3.86/lb, or 8.3 inches) and 1,567,000 fingerlings weighing 76,771 pounds (average 20.41 /lb, or 4.8 inches). The cost of producing the larger fish was \$0.64 per pound or \$165.19 per 1,000, and \$1.50 per pound or \$73.68 per 1,000 for the fingerlings (Appendix 1).

The total cost of producing the 5,246,113 fish weighing 382,705 pounds (average 10.48/lb, or 5.96 inches) in 1994 was \$517,905 or \$1.04 per pound, or \$98.72 per 1,000 (Appendix 1).

A total of 6,028,892 eggs were acquired to yield the fish produced. A total of 2,052,125 eggs were purchased, and the remaining 3,976,767 eggs were acquired from governmental sources at no cost (Appendix 4). A total of 1,510,000 fish were transferred into the Hagerman Hatchery from other hatcheries to ease the loading during the spring and to help meet the fall size requirements (Appendix 4).

FISH FEED

The fish produced during fish year 1994 were fed a total of 490,616 pounds of feed acquired from Rangens, Inc., Bioproducts, and Silver Cup (Appendix 5). The weight gained during 1994 was 382,705 pounds, which resulted in an overall conversion of 1.28 pounds of feed to produced 1 pound of fish, not including the weight of the mortality (Appendix 1).

HATCHERY IMPROVEMENTS

Several hatchery improvements were completed this year. A new hatchery effluent line was constructed from the hatchery building to raceway 1. The break

room and office computer room were painted, as well as the hatchery bathroom. Two large root bundles were removed from the Riley Creek pipeline where they had grown through a seam and blocked the opening of the pipe approximately 30%. New trees and shrubs were added to the hatchery grounds, grass was planted, and a couple of old irrigation lines and some old trees were removed. A wall fan was installed in the shop to remove toxic vapors, and a temporary chicken wire cover was placed on the Riley Creek raceways to keep herons out. Fish loss due to herons was between 10% and 50% in each raceway that was not covered.

Many hours were expended on the bird enclosure system, and most of the supports for the permanent cage are in place. Insulated cable has been stretched to the supports, and now all that is needed is chicken wire to be stretched over the top. The temporary plastic covering on the Tucker Springs raceways will be left in place until the final bird enclosure is completed.

Several smaller jobs pertaining to the upgrading of the residences were accomplished in 1994, such as new panelling installed in residence #1 and staining of the house decks.

Capital outlay expenditures included a new computer and a rebuilt to "zero-time" tug.

The IDFG Engineering Bureau has budgeted money to install a pipeline to carry the Tucker Springs water to the raceways instead of the present open ditch system. This work is scheduled to be performed during October and November of 1995. The hatchery needs money to be appropriated to screen and stabilize the quality of the intake water from Riley Creek.

These improvements were recommended by the Eagle Fish Health Laboratory in 1985 as part of an overall plan to control mortality at Hagerman. These items are crucial steps needed to eliminate the Infectious Hematopoietic Necrosis (IHN) virus and other diseases that Hagerman has experienced for the past 17 years.

PUBLIC RELATIONS

Hagerman Hatchery receives a large number of visitors and sportsmen throughout the year. An estimated 20,000 visitors toured the facility and used the surrounding public grounds this year. The 37 acres of hatchery property is surrounded by 880 acres of the Hagerman Wildlife Management Area (WMA). The WMA provides a large variety of outdoor experiences, including fishing and hunting, watchable wildlife viewing, and family picnic uses.

The hatchery and WMA complex needs to have a comprehensive visitor use plan established to maximize visitor appreciation and the educational value of the area. During 1993, a visitor use and infrastructure analysis was undertaken by the National Park Service concerning the impact that the Hagerman Fossil Beds National Monument will have on the area. Estimates of over 300,000 visitors per year from the first year the signs are installed on the highway are projected. A large portion of these people are going to visit the hatchery and WMA, and we should be ready to handle these people. This monument is projected to be in operation in 1996.

Hatchery personnel were called upon to give school tours during the spring, and several talks were presented to regional personnel. Kevin Price completed an excellent, very intensive historical synopsis on Hagerman Hatchery which appeared in the spring issue of "Idaho Wildlife" magazine.

FISH TAGGING OPERATIONS

The hatchery crew participated in several tagging operations during the year. Three of the Region 4 waters that Hagerman planted received clipped fish (Appendix 6). Two of the waters, Magic Reservoir and Lake Walcott, received clipped fish as part of a return-to-the-creel study that has been ongoing for the past few years.

Island Park Reservoir and Blackfoot Reservoir received fin-clipped fingerlings this year as part of an ongoing study on creel returns (Appendix 6). The results of these tagging and marking efforts should be available from the various regional fishery managers during the summer of 1996.

ACKNOWLEDGMENTS

Thanks to the permanent hatchery staff of Walt Rast, David Costas, and Kevin Price; to the transport operators Ken Taylor and Ralph Taylor; and to the temporaries Paul Hartman, Michelle Ralston, Greg Jay, Bill Hamm, and Vince Decker.

The regional fisheries and enforcement personnel Fred Partridge, Jeff Dillon, Richard Holman, and Gary Hompland also deserve our gratitude.

Appendix 1. Costs of fish produced at Hagerman Fish Hatchery, FY 1994. Costs reflect all costs budgeted except capital outlay plus \$90,000.00 of the fish transportation budget and are based on a weighted average of \$0.0192 per inch of fish produced (\$517,905/26,962,062 inches of fish produced).

| Species/strain | Number of fish produced | Weight pounds | Costs to produce and plant | Cost/1,000 |
|--|-------------------------|---------------|----------------------------|------------|
| FISH ON HAND DECEMBER 31, 1993 | | | | |
| Kamloops x steelhead | 1,257,466 | 96,345 | | |
| rainbow x cutthroat | 244,706 | 18,571 | | |
| Kamloops rainbow | 330,426 | 761 | | |
| Hayspur rainbow | 927,337 | 1,057 | | |
| Totals | 2,759,935 | 116,734 | | |
| FISH PLANTED | | | | |
| Catchables 8 inches and larger | | | | |
| Kamloops x steelhead ≥9 in | 336,392 | 126,283 | 63,065.65 | 187.48 |
| Kamloops x steelhead <9 in | 226,933 | 44,807 | 36,094.39 | 159.05 |
| rainbow x cutthroat <9 in | 213,340 | 23,325 | 32,783.48 | 153.67 |
| Subtotals | 776,665 | 224,415 | \$131,943.51 | \$169.89 |
| Fingerlings smaller than 8 inches | | | | |
| Kamloops rainbow 4.94 in | 778,206 | 42,439 | 72,720.78 | 93.45 |
| Kamloops x steelhead 7.16 in | 337,001 | 55,262 | 45,496.71 | 135.01 |
| Hayspur rainbow 4.52 in | 1,561,572 | 65,300 | 121,626.18 | 77.89 |
| rainbow x cutthroat 5.65 in | 130,527 | 10,602 | 14,948.59 | 114.53 |
| Subtotals | 2,807,306 | 173,603 | 254,792.26 | 90.76 |
| Totals | 3,583,971 | 398,018 | \$386,735.77 | \$107.91 |
| FISH ON HAND DECEMBER 31, 1994 | | | | |
| Catchables 8 inches and larger | | | | |
| Hayspur rainbow <9 in | 95,142 | 24,650 | \$15,716.77 | \$165.19 |
| Fingerlings smaller than 8 inches | | | | |
| Henry's Lake cutthroat 4.7 in | 85,700 | 3,150 | 7,736.98 | 90.28 |
| rainbow x cutthroat 6.73 in | 136,000 | 16,700 | 17,581.13 | 129.27 |
| rainbow trout 4.8 in | 212,900 | 5,275 | 19,640.66 | 92.25 |
| Hayspur rainbow 5.4 in | 614,300 | 43,619 | 47,397.52 | 77.16 |
| Kamloops rainbow 3.25 in | 518,100 | 8,027 | 23,091.20 | 44.57 |
| Subtotals | 1,567,000 | 76,771 | \$115,447.49 | \$73.67 |
| Totals | 1,662,142 | 101,421 | \$131,164.26 | \$78.91 |
| TOTAL FISH PRODUCED | | | | |
| Planted in 1994 | 3,583,971 | 398,018 | 386,735.77 | 107.91 |
| On hand December 31, 1994 | +1,662,142 | +101,421 | 131,164.26 | 78.91 |
| Totals | 5,246,113 | 499,439 | \$517,900.03 | \$98.72 |
| Pounds on hand December 31, 1993 | | -116,734 | | |
| Total weight gained | | 382,705 | | |

Appendix 2. Fish distribution from Hagerman Hatchery, 1994.

| Species/strain | Number | Pounds | Percent of number planted in regions | | | | | | |
|-----------------------|-----------|---------|--------------------------------------|-----|------|------|------|------|-----|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Catchables | | | | | | | | | |
| Kamloops x steelhead | 563,325 | 171,090 | - | - | 20.5 | 49.7 | 20.7 | 9.1 | - |
| rainbow x cutthroat | 213,340 | 23,325 | - | - | 99.2 | 0.8 | - | - | - |
| Subtotal | 776,665 | 224,415 | 0.0 | 0.0 | 41.7 | 37.3 | 14.6 | 6.4 | 0.0 |
| Fingerlings | | | | | | | | | |
| Kamloops rainbow | 778,206 | 42,439 | 20.5 | - | 12.7 | 52.3 | 1.9 | 12.6 | - |
| Kamloops x steelhead | 337,001 | 55,262 | - | - | 85.6 | 8.5 | - | 5.9 | - |
| Hayspur rainbow trout | 1,561,572 | 65,300 | - | - | 8.1 | 46.2 | 6.4 | 39.4 | - |
| rainbow x cutthroat | 130,527 | 10,602 | - | - | - | 85.2 | 14.8 | - | - |
| Subtotals | 2,807,306 | 173,603 | 5.5 | 0.0 | 17.6 | 47.2 | 4.6 | 25.1 | 0.0 |
| Totals | 3,583,971 | 398,018 | 4.3 | 0.0 | 22.7 | 45.1 | 6.7 | 21.2 | 0.0 |

Appendix 3. Fish survival from eyed egg to plant, 1994.

| Species/Strain | Number planted | On hand December 31, 1994 | Total produced | Percent survival |
|------------------------------------|----------------|------------------------------|-------------------|---------------------|
| Troutlodge Kamloops x steelhead | 900,326 | 0 | 900,326 | 53.08 |
| Troutlodge Kamloops rainbow | 191,510 | 0 | 191,510 | 53.83 |
| Ennis Kamloops rainbow | 234,013 | 0 | 234,013 | 34.67 |
| Hayspur Kamloops rainbow | 352,683 | 0 | 352,683 | 52.25 |
| Hayspur rainbow trout | 1,561,572 | 353,691 | 1,915,263 | 48.65 |
| Henrys Lake rainbow x cutthroat | 343,867 | 140,000 | 483,867 | 58.97 |
| Totals | 3,583,971 | 493,691 | 4,077,662 | 54.09 |

Appendix 4. Numbers of eyed eggs received, species, and source for 1994 requests.

| Species/strain | Number received | Source |
|-------------------------------|-----------------|------------------------|
| rainbow, Kamloops x steelhead | 1,696,125 | Troutlodge, Washington |
| Kamloops rainbow | 356,000 | Troutlodge, Washington |
| Kamloops rainbow | 674,927 | IDFG, Hayspur |
| Kamloops rainbow | 597,963 | USFWS, Ennis, Montana |
| Hayspur rainbow/rec'd as fry, | 1,510,000 | IDFG, Cabinet Gorge |
| Hayspur rainbow | 2,426,886 | IDFG, Hayspur |
| rainbow x cutthroat hybrids | 1994 - 543,560 | IDFG, Henrys Lake |
| rainbow x cutthroat hybrids | 1993 - 276,991 | IDFG, Henrys Lake |
| Totals | | |
| eggs | 6,028,892 | |
| fry | 1,510,000 | |
| | 7,538,892 | |

Appendix 5. Fish feed used during Fish Year 1994 at Hagerman Hatchery.

| Size | Source | Pounds | Cost/pound | Cost |
|-----------------------------|-------------|---------|------------|-------------|
| #3/TM | Rangens | 500 | \$0.5065 | \$253.25 |
| #4/TM | Rangens | 1,000 | \$0.5065 | \$506.50 |
| 3/32-inch pellet | | | | |
| Extruded 450 | Rangens | 2,500 | \$0.2522 | \$630.50 |
| 1/8-inch pellet | | | | |
| Low phosphate, high protein | Rangens | 155,850 | \$0.2987 | \$46,552.40 |
| Low phosphate | Rangens | 34,060 | \$0.2397 | \$8,164.18 |
| TM 4000 | Rangens | 8,850 | \$0.4127 | \$3,652.40 |
| 5/32-inch pellet | | | | |
| Low phosphate | Rangens | 65,300 | \$0.2987 | \$19,505.11 |
| | | | | |
| #1,2,3 | Bioproducts | 3,762 | \$1.000 | \$3,762.00 |
| BioDiet #2/TM | Bioproducts | 88 | \$1.336 | \$117.57 |
| BioDiet #3/TM | Bioproducts | 2,024 | \$1.336 | \$2,704.06 |
| BioDry 1000 | | | | |
| 1.0 mm | Bioproducts | 9,750 | \$0.495 | \$4,826.25 |
| 1.0 mm TM | Bioproducts | 880 | \$1.072 | \$943.68 |
| 1.3 mm | Bioproducts | 10,200 | \$0.495 | \$5,049.00 |
| 1.5 mm | Bioproducts | 21,250 | \$0.45 | \$9,562.50 |
| 2.0 mm | Bioproducts | 5,900 | \$0.45 | \$2,655.00 |
| 2.5 mm | Bioproducts | 7,800 | \$0.44 | \$3,432.00 |
| BioDry 500 | | | | |
| 1.5 mm | Bioproducts | 1,300 | \$0.41 | \$533.00 |
| 2.0 mm | Bioproducts | 11,200 | \$0.41 | \$4,592.00 |
| 2.5 mm | Bioproducts | 60,950 | \$0.32 | \$19,504.00 |
| 3.0 mm | Bioproducts | 22,500 | \$0.29 | \$6,525.00 |

Appendix 5. Continued.

| Size | Source | Pounds | Cost/pound | Cost |
|-----------------------|-------------|---------|------------|--------------|
| Biodiet | | | | |
| 2.5 mm TM | Bioproducts | 880 | \$1.018 | \$895.94 |
| 3.0 mm | Bioproducts | 1,980 | \$0.51 | \$1,009.80 |
| 3.0 mm TM | Bioproducts | 2,112 | \$0.9815 | \$2,072.83 |
| Floating | | | | |
| 1.5 mm, low phosphate | Silvercup | 1,200 | \$0.365 | \$438.00 |
| 2.5 mm, low phosphate | Silvercup | 3,000 | \$0.311 | \$622.00 |
| 3.5 mm, low phosphate | Silvercup | 35,720 | \$0.257 | \$9,180.04 |
| | | 20,060 | \$0.237 | \$4,754.22 |
| Totals | | 490,616 | \$0.3311 | \$162,443.13 |

Appendix 6. Summary of fish marked in 1994.

| Date planted | Species | Water | Number | Pounds | Clip/Tag |
|--------------|---------------------|-----------------------|---------|--------|----------------|
| 05/12/94 | Hayspur rainbow | Milner Reservoir | 50,000 | 1,441 | Adipose |
| 05/24/94 | Kamloops x | Magic Reservoir | 24,975 | 5,550 | Left maxillary |
| 06/09/94 | Hayspur rainbow | Devil's Creek | 4,370 | 1,150 | Adipose |
| 06/13/94 | Kamloops rainbow | Island Park Reservoir | 9,998 | 580 | Right ventral |
| 06/28/94 | Hayspur rainbow | Island Park Reservoir | 35,000 | 769 | Left ventral |
| 09/15/94 | Hayspur rainbow | Lake Walcott | 49,490 | 4,900 | Right ventral |
| 09/20/94 | Kamloops rainbow | Lake Walcott | 50,040 | 3,600 | Left ventral |
| 09/21/94 | Hayspur rainbow | Magic Reservoir | 50,170 | 2,900 | Adipose |
| 10/18/94 | rainbow x cutthroat | Blackfoot Reservoir | 19,327 | 385 | Adipose |
| Totals | | | 293,370 | 21,275 | |
| 02/17/94 | rainbow trout | Oster #1 | 50 | 19 | Jaw tag |
| 02/17/94 | rainbow trout | Riley Creek | 50 | 19 | Jaw tag |
| 08/18/94 | Kamloops x | Oster #1 | 50 | 22 | Jaw tag |
| 08/18/94 | Kamloops x | Riley Creek | 50 | 22 | Jaw tag |
| Totals | | | 200 | 82 | |

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
HAYSPUR FISH HATCHERY
1994**

**Bob Esselman, Fish Hatchery Manager I
Doug Young, Assistant Fish Hatchery Manager
Paul Dorman, Fish Culturist**

INTRODUCTION

Hayspur Fish Hatchery is a license-funded resident salmonid broodstock and production facility. Two captive broodstocks, rainbow trout Oncorhynchus mykiss, designated Hayspur strain and a Kamloop population, derived from Skanes/Gloyd Springs stock, are maintained on station. Since the start of facility renovation in 1989, eyed egg production for 11 resident programs has been a priority. Catchables and fingerlings are reared for stocking into waters of the Magic Valley, Salmon, and Panhandle regions. An on-site, free, public campground, consumptive pond fishery, and a trophy stream fishery are maintained by hatchery personnel.

The hatchery is located in Blaine County, approximately 40 miles south of Sun Valley, on Loving Creek. Fish culture facilities include an incubation building housing Heath stacks, isolation incubators, moist egg chiller, early rearing troughs, a hatchery building with 20 early rearing tanks, 12 covered 24-foot circular ponds, 6 small fingerling tanks, 6 large production raceways, and an earthen brood pond.

Water sources include the Hayspur Spring of 3.0 to 5.5 cubic feet per second (cfs) at 52°F (11.6°C), three pumped artesian wells producing 5.0 cfs at 48°F to 52°F (8.9°C to 11.6°C), and 7.4 to 18 cfs of Loving Creek water at 33°F to 73°F (0.6°C to 22.7°C).

Three permanent employees (Fish Hatchery Manager 1, Assistant Fish Hatchery Manager, and Fish Culturist) and 16.6 months of temporary Bio-Aide time are assigned to the Hayspur Hatchery. Usually, three Bio-Aides are hired for spawning season and one for the summer field season.

RAINBOW AND KAMLOOP EGG PRODUCTION

The spawning season during 1994 lasted for eight months, with an egg take of 14,461,852 eggs during the period covered. There were 5,472 females spawned. Photoperiod manipulation, or light control, has expanded the "normal" spawn timing to more closely match egg production to egg requests of 11 resident hatcheries. Moist egg chiller technology provides an additional tool towards egg production compatibility with eyed egg requests. A total of 11,226,940 eyed eggs were produced. Rainbow trout eyed egg production totaled 9,076,702. Kamloop eyed egg production totaled 2,150,238 (Appendix 1). Hagerman, Nampa, American Falls, Grace, Ashton, Clark Fork, Mackay, McCall, and Hayspur hatcheries were shipped eggs as per their requests (Appendix 2). Cabinet Gorge and Sandpoint hatcheries were shipped eggs in excess of requests or to provide fry for Hagerman through delayed development. These shipments represent over \$176,000 if they were purchased at the current contract price.

FISH PRODUCTION

A total of 1,015,574 rainbow trout were produced (Appendix 3). Catchable production totaled 427,128 fish that weighed 100,353 pounds. Hayspur Hatchery stocked 203,728 catchable rainbow trout into Magic Valley and Salmon regional waters (Appendix 4). These fish were stocked into the Big Wood, Little Wood, and upper Salmon river drainages. Catchable rainbow trout were transferred to Mullan and Sawtooth hatcheries. Mullan Hatchery was shipped 15,400 catchables for redistribution into the Coeur d'Alene, St. Maries, and St. Joe river drainages. Sawtooth Hatchery was shipped 66,762 catchables for redistribution into the Salmon River, Salmon River tributaries upstream of the Pahsimeroi River, and Stanley basin lakes (Appendix 5). Hayspur Hatchery stocked 25 stream reaches, reservoirs, lakes, ponds, and canals in 130 trips.

On May 25, 1994, the National Marine Fisheries Service (NMFS) issued Permit #908 to the Idaho Fish and Game. This permit imposed a 10-inch (25 cm) length limit on catchable rainbow trout planted in the Salmon River drainage. Catchable rainbow trout transported to Sawtooth Hatchery averaged under 10 inches (25 cm).

Our put-and-take signing directive was met with some opposition from the Sawtooth National Forest. The goal of concentrating anglers at stocking sites was in conflict with the Forest's goal of riparian protection. A cooperative ride-along with representatives from both agencies identified sites where angler traffic could be tolerated and signs were put up in these areas.

Little Wood Reservoir was stocked with 59,901 (858 pounds) spring fingerlings. The length range of these fingerlings was 3.05 inches to 3.58 inches. Rock Creek was stocked with 50,575 (175 pounds) 2.05-inch average length fingerlings; mitigation of fish lost to a spill at Amalgamated Sugar plant in Twin Falls.

Fall fingerlings stocked totaled 13,620 fish weighing 538.75 pounds. Magic Reservoir was stocked with 3,620 fingerlings. Little Wood Reservoir was stocked with 10,000 fingerlings.

FIN QUALITY

Fin quality continues to be monitored. The Ashton method was applied to a 20-fish sample immediately prior to stocking from each of the six large catchable raceways. Fin ratio averages from these fish compared to wild fish fin ratios were as follows:

| | | |
|-----------|---|-----|
| Raceway A | = | 53% |
| Raceway B | = | 53% |
| Raceway C | = | 55% |
| Raceway D | = | 55% |
| Raceway E | = | 59% |
| Raceway F | = | 58% |

Average fin quality was 55.38% for 1994. This compares to 55.27% for 1993. Our goal remains 70%.

HATCHERY IMPROVEMENTS

Improvements to the hatchery are listed below:

- Four covered 24-foot circular ponds and associated plumbing were constructed.
- An additional 100 down-welling incubators were obtained in a labor exchange with Eagle Sockeye Research. A total of 200 sub-families can now be accommodated.
- Three-quarters of a mile of entrance road was scarified, graveled, and paved.
- The roof of the spring house was replaced.
- The new residence area had landscaping, lawn hydroseeding, a concrete patio, a concrete driveway, a concrete garage pad, and two spruce trees planted.
- Native water birch and bitterbrush were planted on the Loving Creek rehabilitation area. Six Russian olive trees were planted in the campground.

During construction of an additional four circular ponds and their associated plumbing, the 24-inch and 12-inch inlet lines were compromised. The circular brood ponds, incubation building, hatchery building, and small raceways were dewatered while emergency repairs were completed. Five hundred and fifty 2-year-old Hayspur strain broodstock replacements were lost, and all populations were stressed. Within 48 hours, materials for permanent repair were obtained and a support system of aerators, pumps, oxygen lines, carbon stones, and personnel were in place. The entire brood population of over 21,600 pounds was kept alive on the support system for two hours and three minutes while permanent repair was completed. Other than some poor eye-up rates in the Kamloops, few effects were noticed.

Needs of the hatchery listed in order of priority:

- Install backup generators for wells #2 and #4. Hayspur Hatchery is poised for a catastrophic fish loss without them.

- Hatchery building modifications: install a pipe header and valves, demolish six early rearing tanks and install 1-m diameter and 2-m diameter early rearing units to accommodate replacement broodstock populations. Upgrade electrical wiring and windows, and paint the interior and exterior of the building.
- Provide security fencing around the electrical control panels and pumps.
- Replace the domestic water lines and domestic pump/pressure tank.

BROODSTOCK MANAGEMENT

Spawning season at Hayspur Hatchery has been a dynamic process in terms of capability, requests, genetic management, and pathogen status. A stringent Bacterial Kidney Disease (BKD) management program based on ELISA and modified FAT results was implemented. Positive results from females used for broodstock replacement will be culled from the population with the exception of ELISA lows. A 10% introgression of feral rainbows trapped from Loving Creek was continued for second season. These fish are thought to have demonstrated survival in the wild and provide gametes from the "founding" population. A total of 21 feral adults contributed.

Isolation incubation was upgraded with 100 additional units for a total of 200. Two hundred and six Hayspur strain families were placed in isolation incubation until results from Eagle Fish Health Laboratory were obtained and cull decisions agreed upon. Based on two seasons of ELISA data, altering criteria and culling ELISA lows was discussed.

The four additional circular ponds increased opportunity and capability. Discussions and presentations directed toward supervision, research, and management pertaining to the founding and performance of the Colorado River broodstock potentially destined for Hayspur were performed.

FISH FEED

Feed manufactures were changed from Rangens to Bioproducts. Bioproducts BioDiet low phosphorus diet was fed to the catchables. It was felt that a proactive approach to nutrient loading on a tributary to a world famous trout stream was prudent. An evaluation of conversions, health, and growth demonstrated little difference in performance.

Broodstock were fed Rangens 1/4-inch pellet with 150 grams per ton canthaxathin (Appendix 6). This additive provides acceptable egg color, but controversy remains as to quality and/or health benefits.

PUBLIC RELATIONS

Doug Young, Assistant Hatchery Manager, developed and presented a weekly stocking/fishing report over two local radio stations. Comments by anglers and guides indicated a positive response to this reporting method.

Tours were given to area schools. Bellevue Elementary, Hailey Elementary, Hailey Middle School, Hemingway School (Ketchum), Cornerstone Academy (Ketchum), and the College of Southern Idaho aquaculture students were among touring groups. Organized groups, such as Flyfishers of Idaho, Good Sam RV Club of Jerome, and the Boy Scouts were given tours.

Eyed eggs were shipped to various schools. Schools in Naples, Kellog, Stanley, and Horseshoe Bend received eggs, and the resultant fry were stocked out into area waters as part of Adopt-a-Stream projects. The Morrison-Knudsen Nature Center was shipped eyed eggs for public viewing of the developmental stages.

Approximately 7,000 folks visited, camped, and/or fished Gaver Lagoon or Loving Creek on the hatchery property. Gaver Lagoon continues to be a popular fishery for a variety of anglers, including the physically challenged and children. A national level field trial event for retrievers was held on the hatchery property during the summer.

Hayspur Hatchery personnel assisted regional fishery staff with electrofishing surveys and salvage operations. Personnel helped Rick Wilkinson of Idaho State University with a study of population dynamics and food habits of brown trout in Silver Creek. Hatchery personnel assisted with big game and upland game bird check stations. Personnel were particularly active in dealing with big game and waterfowl violations.

The Hayspur Campground enjoyed the efforts of a volunteer Camp Host. Travis and Sherry Dilleha volunteered time to answer questions, give directions, tidy up outhouses, clean up litter, provide fishing tips and demonstrations, and generally enhanced the image of the Department.

SPECIAL PROJECTS

Loving Creek Rehabilitation Project

A reach of Loving Creek downstream of the hatchery was rehabilitated in 1992. This reach, which was not stocked, has developed a strong population of wild and feral fish. Guides and outfitters brought clients to fish on the project. At least 23 fish over 20 inches were caught and verified. Five species of mayflies were observed on the rehabilitated section. Angler sign-in comments reflect high catch rates, good fishing, and support of the project. Many visitors came to observe migratory birds and nongame species. A memorial and bench were placed along the creek for the late Frank Gift. Mr. Gift not only came up with the concept for the project but worked hard to sell the idea and worked on site. Waterfowl and waterfowl hunters utilized the project throughout the season.

Baker Lake Golden Trout Project

The Hayspur Hatchery staff operates a golden trout Oncorhynchus aguabonita trapping and spawning project at Baker Lake. Baker Lake (elevation 8,796 feet) is an alpine lake of 12 surface acres in the upper Big Wood River drainage. The lake, located 30 miles northwest of Sun Valley, is reached by way of a 1 1/4-mile hike from a trailhead at the end of Baker Creek Road.

The trap was not installed this season. No fish were available for stocking. Observations at the lake indicate a reduction in biomass of species other than golden trout. The trap will be operated in 1995, and the results will drive future effort.

ACKNOWLEDGEMENTS

The efforts of Bio-Aides Tom Kendall, Bob Turzian, and Jonathan Greer during the spawning season are to be commended. They worked hard, kept a sense of humor, and generated a lot of eyed eggs. Angel Brodie (JTPA) returned for her third summer. She has grown in her contribution as an astute fisheries worker and plans to enter the fisheries area in college. Jason Bradley was our summer Bio-Aide. Jason added an element of diversity to the crew.

Appendix 1. Egg production summary, 1994.

| Species | Total green eggs | Total eyed eggs | Total eggs |
|-------------|------------------------|-----------------|-------------------------|
| Kamloops | ^a 3,171,411 | 2,150,238 | ^b 3,174,824 |
| rainbow-SPF | ^a 9,668,455 | 7,836,873 | ^b 10,058,697 |
| rainbow-REG | ^a 1,621,986 | 1,239,829 | ^b 1,638,323 |
| Totals | 14,461,852 | 11,226,940 | ^b 14,871,844 |

^a Yearly running total of green eggs.

^b Eyed eggs and dead eggs combined.

SPF - Specific pathogen-free eggs.

REG - Eggs taken from non-pathogen-free fish.

Appendix 2. Egg shipment summary, 1994.

| Hatchery | Species | Total eggs shipped | Estimated value ^a |
|----------------|-------------------------------|--------------------|------------------------------|
| American Falls | Hayspur rainbow | 656,789 | \$10,180.23 |
| Ashton | Hayspur rainbow | 279,531 | \$4,332.73 |
| | Kamloops rainbow | 119,790 | \$1,856.75 |
| Cabinet Gorge | Hayspur rainbow | 1,036,903 | \$16,071.99 |
| | Kamloops rainbow | 691,041 | \$10,718.05 |
| Clark Fork | Hayspur rainbow | 286,321 | \$4,437.98 |
| | Kamloops rainbow | 23,574 | \$365.40 |
| Grace | Hayspur rainbow | 1,077,441 | \$16,700.34 |
| Hagerman | Hayspur rainbow | 3,585,679 | \$55,578.02 |
| | Kamloops rainbow | 783,591 | \$12,145.66 |
| Hayspur | Hayspur rainbow | 624,159 | \$9,674.46 |
| | Kamloops rainbow | 11,802 | \$182.93 |
| McCall | Hayspur rainbow | 61,351 | \$950.94 |
| | Kamloops rainbow | 13,000 | \$201.50 |
| Mackay | Hayspur rainbow | 331,098 | \$5,132.02 |
| Nampa | Hayspur rainbow | 291,751 | \$4,522.14 |
| | Kamloops rainbow | 146,328 | \$2,268.08 |
| Sandpoint | Hayspur rainbow | 1,253,495 | \$19,429.17 |
| | Kamloops rainbow | 102,762 | \$1,592.81 |
| Others | Hayspur + Kamloops rainbow | 3,000 | --- |
| Totals | | 11,379,706 | ^a \$176,385.44 |

Appendix 3. Hayspur production summary, 1994.

| Size | Total number | Total pounds | Description/Destination |
|--------------------------|--------------|--------------|--------------------------------------|
| Catchables | 285,890 | 95,917 | ^a P&G/Regions 1, 4, and 7 |
| Precatchables | 223,400 | 35,736 | P&G/Regions 1, 4, and 7 |
| Fingerlings ^d | 163,284 | 2,949 | ^b P&T, ccPG&T/other |
| Fry ^e | 343,000 | 227 | P&T, PG&T/other |
| Totals | 1,015,574 | 134,829 | |

^aP&G = Put-and-Grow

^bP&T = Put-and-Take

^cPG&T = Put-Grow-and-Take

^dR9 (stocked) = 123,476/1,371 lbs

R9 (transferred to Hagerman) = 34,547/1,350 lbs

K1 (stocked) = 5,261/227 lbs

^eApproximately 225,000 for P&T in 1996.

Approximately 118,000 for PG&T and broodstock replacement in 1996.

Appendix 4. Hayspur stocking summary, 1994.

| Fish size | Number of fish | Pounds of fish |
|-------------|----------------|----------------|
| Catchables | 203,728 | 64,617 |
| Fingerlings | 128,737 | 1,599 |
| Totals | 332,465 | 66,216 |

Appendix 5. Fish transfer summary, 1994.

| Shipped from | Received | Average size (inches) | Number of fish |
|--------------|-------------------|--|--------------------------|
| Nampa | Hayspur | 17.0-20.0 | 2,990 - R9 |
| Nampa | Hayspur | 19.0-22.0 | 847 - K1 |
| Hayspur | Hagerman | 4.1-4.5 | 34,547 - R9 |
| Hayspur | Nampa Nampa | ^a 4.1-4.5 ^a 2.5-2.8 | 5,000 - R9 3,000 - K1 |
| Hayspur | Mullan/Clark Fork | 9.5-11.0 | 15,400 - R9 |
| Hayspur | Sawtooth | 8.0-9.5 | 66,762 - R9 |
| Total | | | 128,546 |

^a Fingerlings for Hayspur broodstock replacement in 1996.

Appendix 6. Feed records, Hayspur Hatchery, 1994.

| Date | Feed/Company | Size | Pounds | Cost | Total cost |
|------------|--------------|--|---------------------------------|---|------------|
| 01/06/94 | Rangens | swim-up #1 str #2 str | 50 100 50 | 22.20 44.40 22.20 | 88.80 |
| 01/25/94 | Rangens | #1 str 1 /4 brd | 100 2,000 | 44.33 639.60 | 683.93 |
| 02/02/94 | Rangens | 5/32 | 20,680 | 4,816.37 | 4,816.37 |
| 02/08/94 | Rangens | #1 str | 150 | 66.50 | 66.50 |
| 02/15/94 | Rangens | 1 /4 brd #1 str #2 str #3 str #4 crmbl | 500 250 250 250 150 | 159.90 110.83 110.83 110.83 44.24 | 536.63 |
| 02/15/94 | Rangens | 1/4 brd | 11,600 | 3,616.80 | 3,616.80 |
| 03/01/94 | Rangens | #2 str #3 str | 250 250 | 110.83 110.83 | 221.66 |
| 03/1 1 /94 | Rangens | 5/32 flo #3 str | 17,620 150 | 4,850.79 66.50 | 4,917.29 |
| 03/23/94 | Rangens | #2 str #3 str #4 crmbl #4 crmbl-TM | 50 500 150 800 | 22.17 221.65 44.24 389.28 | 677.34 |
| 04/04/94 | Rangens | #3 str-TM #4 crmbl-TM #3 str #4 crmbl | 250 750 250 750 | 121.65 356.95 221.18 110.83 | 818.61 |
| 04/14/94 | Rangens | #3 str-TM #4 crmbl-TM | 350 800 | 170.31 389.28 | 559.59 |

Appendix 6. Continued.

| Date | Feed/Company | Size | Pounds | Cost | Total cost |
|------------------|--------------------------------|---------------------------------|-------------------------|--------------------------------|-------------|
| 04/22/94 | Rangens | #3 str-TM #4 crmbl-TM | 150 300 | 72.99 145.98 | 218.97 |
| 04/26/94 | Rangens | #4 crmbl-TM 5/32 flot | 350 20,840 | 170.31 5,737.25 | 5,907.56 |
| 04/28/94 | Rangens | #4 crmbl | 500 | | 147.45 |
| 05/05/94 | Rangens | #4 crmbl 3/32 | 1,000 500 | 294.00 120.35 | 414.35 |
| 05/16/94 | Rangens | 1 /4 brd 10 3/32 #4 crmbl | 9,220 7,000 1,750 | 2,913.52 1,684.90 514.50 | 5,112.92 |
| 06/30/94 | Rangens | 5/32 flot #1 str #2 str | 11,300 50 100 | 3,107.50 22.15 44.30 | 3,173.95 |
| 08/01/94 | Rangens | 1 /4 brd 10 | 11,010 | | 3,487.97 |
| 12/20/94 | Rangens | 1 /4 brd 10 | 15,960 | | 5,008.25 |
| TOTAL RANGENS | | | 139,080 | | \$40,474.94 |
| 01/19/94 | BioDiet | 4 mm/TM/med | 1,326 | | 1,451.52 |
| 01/25/94 | BioDiet | 4 mm/TM/med | 4,729 | | 4,620.69 |
| 07/15/94 | BioDry BioDry | 2.5 mm 3.0 mm | 4,862 3,536 | 682.00 496.00 | 1,178.00 |
| 07/28/94 | BioDry BioDry 500 BioDry | 2.5 mm 2.5 mm 3.0 mm | 9,724 3,978 7,735 | 1,056.00 432.00 840.00 | 2,328.00 |

Appendix 6. Continued.

| Date | Feed/Company | Size | Amount/lbs | Amount | Total |
|-------------------|------------------------|------------------|------------|----------------|-------------|
| 09/01/94 | BioDry | 3.0 mm | 2,000 | | 480.00 |
| 09/14/94 | BioDry/low phos | 3.0 mm | 17,680 | | 2,480.00 |
| 10/04/94 | BioDry/low phos | 4 mm bulk | 10,000 | | 2,900.00 |
| 12/01/94 | BioDiet BioDiet | #1 str #2 str | 44 88 | 42.10 84.20 | 126.30 |
| 12/27/94 | BioDiet BioDry 1000 | #3 str 1.0 mm | 44 110 | 46.94 28.00 | 74.94 |
| TOTAL BIOPRODUCTS | | | 65,856 | | \$15,639.45 |
| GRAND TOTALS | | | 204,936 | | \$56,114.39 |

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

KOOTENAI FISH HATCHERY

1994

**John Siple, Assistant Fish Hatchery Manager
Paul Anders, Fishery Biologist, Kootenai Tribe of Idaho
John Thorpe, Fish Hatchery Manager II**

INTRODUCTION

The Experimental Kootenai White Sturgeon Hatchery (Kootenai Hatchery) is located in Boundary County, Idaho, approximately three miles west of Bonners Ferry, in extreme north Idaho. Construction of the facility was completed during the spring of 1991 as a resident fish mitigation measure under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program [Section 900 (g) (1) 1987 (H); Action Plan, section 1403 (7.5)]. Funding for this facility was provided by Bonneville Power Administration (BPA) under the auspices of the Northwest Power Planning and Conservation Act (P.L. 96-50, 1980).

Staff at the Kootenai Hatchery during 1994 included a hatchery superintendent (Idaho Fish and Game) and three permanent Kootenai Tribal fisheries personnel. During 1994, the Kootenai Hatchery staff reared 1- and 2-year-old white sturgeon from the 1992 and 1993 brood years and incubated and hatched approximately 10,000 certified disease-free rainbow trout eggs. The Kootenai Hatchery was established for experimental rearing of Kootenai River white sturgeon Acipenser transmontanus as part of a BPA project evaluating the status and reproductive viability of white sturgeon in the Kootenai River. Two-year-old white sturgeon hatched and reared in the Kootenai Hatchery were released into the Kootenai River during the fall of 1994. Ninety-one age 2 white sturgeon (> 70 cm total length [TL]) were tagged with Passive Integrated Transponders (PIT-tagged), marked with a scute removal pattern, and an external Floy dart tag prior to release. Eighteen of these 91 fish were also fitted with radio or sonic transmitters. Collection of habitat use, movement, and migration data is ongoing during the fall and winter of 1994 and 1995. Results of juvenile telemetry work will be published in the 1995 annual report for this project.

From May through August of 1994, all the Kootenai Hatchery personnel contributed considerable time and effort to the monitoring and evaluation of natural spawning of white sturgeon in the Kootenai River. The hatchery staff was also responsible for collecting habitat use, movement and migration data using sonic telemetry gear in the Kootenai River in Idaho and British Columbia, as well as in Kootenai Lake, British Columbia from August through December 1994.

Hatchery Design

The Kootenai Experimental Hatchery is a metal pole building, 17.8 m long and 12.5 m wide, housing egg incubation jars, a variety of rearing tanks, an office, laboratory space, a back-up diesel generator (to maintain electricity during utility failure), and a water level activated alarm siren/phone dialer. Rearing tanks consist of two rectangular tanks 3.66 m in length by 0.36 m wide by 0.45 m high; one rectangular tank 3.66 m in length by 0.56 m wide by 0.30 m high; one rectangular tank 3.09 m in length by 0.37 m wide by 0.47 m high; ten rectangular tanks 1.20 m

in length by 0.60 m wide by 0.40 m high; three rectangular tanks 1.20 m in length by 0.45 m wide by 0.57 m high; three circular tanks 3.06 m in diameter by 1.53 m high; and three 1.53 m diameter circular tanks and 1.22 m high.

Water Supply

The facility has two water supply systems; Kootenai River water and Bonners Ferry city water. A new double primary pump system was designed for the Kootenai Hatchery and installed during May of 1993 (Siple and Anders 1993). The intake system contains two electric 7.5-hp submersible pumps, each in a separate 8-inch diameter steel pipe. One pump runs for 24 hours before the system automatically switches to the second pump for the next 24 hours. A third pump (portable gasoline 8-hp) was also purchased for further water reliability in the event that both primary electrical pumps fail simultaneously, or in case of generator failure during a power outage. This gas-powered pump can deliver up to 190 gpm depending on river surface elevation.

Kootenai River water is pumped into a head-box at approximately 947 l/min and is distributed for egg incubation, larval and juvenile rearing, and holding pre- and post-spawning broodstock. The gravity-fed city water is first dechlorinated through two activated charcoal canisters. Then the water goes through a column packed with aeration media (shot shell wads) and then into a head-box for distribution.

Kootenai River water temperature varies by season from a low of 1°C in the winter and as warm as 23°C in the summer (Anders 1991). The city water temperature also varies seasonally (Siple and Anders 1993). During 1994, Kootenai River water temperature in the hatchery ranged from 1°C to 19°C.

Daily river water temperature ranges in the Kootenai Hatchery included:

| <u>Month</u> | <u>Temperature ranges (Celsius)</u> |
|--------------|-------------------------------------|
| January | 5-8 |
| February | 1-5 |
| March | 5-8 |
| April | 6-9 |
| May | 9-12 |
| June | 11-16 |
| July | 10-16 |
| August | 16-19 |
| September | 15-17 |
| October | 7-11 |
| November | 5-7 |
| December | 4-6 |

City water was not used in the hatchery during 1994 as this water source is only used to incubate eggs and rear early life stages, neither of which were produced in the hatchery during 1994.

An electric water heater can be used for city and river water in the winter, increasing the water temperature to 17°C in three rearing tanks. An additional heat pump (heater/chiller) can be used for additional control of water temperature in the hatchery. However, this chiller has a limited capacity; heating or chilling 3-4 gpm or two rearing tanks using a recirculation system.

Utility Failures

Power outages at the Kootenai Hatchery during 1994:

| <u>Date</u> | <u>Cause</u> |
|-------------|---------------------------------|
| 3/17/94 | Electrical storm |
| 3/24/94 | Electrical storm |
| 5/25/94 | Electrical storm |
| 6/13/94 | Electrical storm |
| 7/3/94 | Generator check |
| 7/14/94 | Generator check |
| 7/25/94 | Electrical storm |
| 8/4/94 | Unknown |
| 10/30/94 | Utility work (predicted outage) |
| 11/30/94 | Generator check |

FISH PRODUCTION

White Sturgeon

Brood Year 1992

There were 401 age 2 (brood year 1992) white sturgeon on hand on January 1, 1994 at the Kootenai Hatchery. Large decreases in brood year 1992 fish numbers were due to transfers (Appendix 1). See Appendix 2 for white sturgeon production data.

Brood Year 1993

On January 1, 1994, 2,132 age 1 white sturgeon (brood year 1993) were held in the Kootenai Hatchery. During April 1994, all 1993 brood year fish were moved out of the Kootenai Hatchery to make room for anticipated spawning and rearing activities during 1994. See Appendix 2 for white sturgeon cost data.

Rainbow Trout (Kootenai Hatchery Only)

On November 27, 1994, approximately 10,000 certified disease-free rainbow trout Oncorhynchus mykiss eggs (House Creek stock) were brought to the Kootenai Hatchery. Eggs from this stock of rainbow trout were acquired because they were the only federally certified disease-free trout eggs available in Idaho. Eggs were attained from the College of Southern Idaho, where this stock has been annually certified as disease-free since 1978. The Kootenai Hatchery provides an opportunity for aquaculture training for Tribal members. Rainbow trout eggs were acquired to provide such aquaculture training opportunities. Eggs began hatching during late December.

HATCHERY IMPROVEMENTS

During December 1994, two freestanding raceways (30 ft x 5 ft x 4 ft) were installed outdoors at the Kootenai Hatchery to increase holding area for white sturgeon and rainbow trout. No other hatchery improvements occurred during 1994 at the Kootenai Hatchery.

FISH HEALTH

Brood Year 1992

Kootenai Hatchery

Health of brood year 1992 in the Kootenai Hatchery was very good during the entire year. No symptoms of bacterial, fungal, or viral diseases were observed with the 1992 brood year. No fish were tested for presence of white sturgeon iridiovirus (WSIV) because no symptoms were observed, and testing requires sacrificing fish.

University of Idaho Hatchery

No fish from brood year 1992 were taken to the University of Idaho Hatchery during 1994.

Sandpoint Hatchery

During 1994, no symptoms of bacterial, fungal, or viral diseases were observed with brood year 1992 held at the Sandpoint Hatchery. No fish reared in the Sandpoint Hatchery during 1994 were tested for presence of WSIV because no symptoms were observed, and testing requires sacrificing fish.

Brood Year 1993

Kootenai Hatchery

Health of brood year 1993 in the Kootenai Hatchery was very good during all of 1994. No symptoms of bacterial, fungal, or viral diseases were observed in the 1993 brood year. On March 7, 1994, five fish were tested for WSIV. On June 23, 1994 we received a report indicating these five fish were negative for WSIV.

University of Idaho Hatchery

During May, 1994, a WSIV outbreak occurred at the University of Idaho Hatchery. Since WSIV outbreaks are stress mediated, fish transport and handling and acclimation to a new water source may have contributed to this outbreak. However, no mortality and no evidence of WSIV were observed with 112 age 2 white sturgeon held separately in the same hatchery after being brought in from Clear Springs Research Labs (Buhl, Idaho), where an intentional outbreak of WSIV occurred to study the pathenogenicity of WSIV.

The fact that the 112 fish brought to the University of Idaho Hatchery from Clear Springs (survivors of documented WSIV outbreak) all survived at the University hatchery following transport is consistent with WSIV literature that suggests resistance or some form of immunity resulting from WSIV exposure. No evidence has been presented, published or unpublished, of survivors of a WSIV outbreak ever subsequently displaying any lethal or non-lethal symptoms of WSIV.

Sandpoint Hatchery

During 1994, no symptoms of bacterial, fungal, or viral diseases were observed in the 1993 brood year fish held at the Sandpoint Hatchery. No fish reared in the Sandpoint Hatchery during 1994 were tested for presence of WSIV because no symptoms were observed and testing requires sacrificing fish.

Rainbow Trout

Health of rainbow trout at the Kootenai Hatchery was very good during December 1994. No evidence of any bacterial, fungal, or viral diseases was observed for rainbow trout during 1994.

FISH STOCKED AND TRANSFERRED

On July 29, 1994, 41 fish from the 1992 brood year were released at Ambush Rock and at the Kootenai Hatchery site (Appendix 3).

On August 4, 1994, 40 fish from the 1992 brood year were released at Smith Island (Appendix 4).

On September 29, 1994, 10 fish from the 1992 brood year were released at two sites on the Kootenai River in Montana (Appendix 5).

During 1994, no other releases of Kootenai River white sturgeon occurred.

FISH TRANSFERRED

On April 20, 1994, 1,837 (11.94 lbs) brood year 1993 sturgeon were transferred from the Kootenai Hatchery to the University of Idaho Hatchery in Moscow. One fish died as a result at the time of transport.

On April 18-19, 1994, 400 (270.11 lbs) brood year 1992 sturgeon and 175 (3.95 lbs) brood year 1993 sturgeon were transferred from the Kootenai Hatchery to the Sandpoint Hatchery.

On May 18, 1994, 100 brood year 1992 sturgeon were transferred back to the Kootenai Hatchery from the Sandpoint Hatchery for experimental release into the Kootenai River.

During 1994, no other transfers of Kootenai River white sturgeon occurred.

FISH SPAWNING

No fish were spawned at the Kootenai Hatchery during 1994.

FISH FEED

Rangen soft-moist fish feed was used at the Kootenai Hatchery for rearing white sturgeon (Appendix 6).

Rangen swim-up trout and salmon starter feed was fed to rainbow trout in the Kootenai Hatchery during December 1994.

PUBLIC RELATIONS

Thirty-one documented tours of the Kootenai Hatchery were given to public and private groups during 1994. Citizens took 28 tours, 2 were school groups, and 1 was a group of BPA employees.

Additional undocumented tours also occurred during 1994. More tours were requested, but since only five white sturgeon were held in the Kootenai Hatchery since September 1994, many were canceled.

RECOMMENDATIONS

General aquaculture recommendations for 1995 include:

1. Increase capacity to control water temperatures in the facility to improve survival at critical life stages.
2. Further refine hand stripping egg removal techniques using females with normally developed ovaries.
3. Broodstock collected should be transported to the facility as soon as possible to reduce stress.
4. Conduct aquaculture operations consistent with the USFWS Breeding Plan to Preserve Genetic Variability of the Kootenai River White Sturgeon (Kincaid, 1993).
5. Do not make any unnecessary transfers of fish to and from the Kootenai Hatchery.

Fish health recommendations for 1995 include:

1. Continue cooperate disease work with Eagle, Clear Springs, and U.C. Davis Fish Pathology Laboratories in testing for and researching effects of white sturgeon iridovirus.
2. Notify pathologists when adult broodstock are to be captured so that disease samples may be collected from the wild population.

ACKNOWLEDGMENTS

During 1994, the Kootenai Experimental White Sturgeon Facility crew included John Siple, Larry Aitken, Robert Aitken, and Ron Tenas.

The Kootenai Tribe Fisheries Program also thanks the Bonneville Power Administration for funding this project and operations of the Kootenai Hatchery.

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Appendix 1. Fish production at the Kootenai Hatchery, January 1 to December 1, 1994.

| Species/Strain | Beginning number | Beginning pounds | Ending number | Ending pounds | Number stocked | Number transferred | Destination |
|-------------------------------|------------------|------------------|---------------|---------------|----------------|--------------------|----------------|
| Kootenai white sturgeon, BY92 | 401 | 270 | 5 | 16.21 | 91 | 351 | Kootenai River |
| Kootenai white sturgeon, BY93 | 2,132 | 10.66 | 0 | 0 | 0 | 1,962 | Kootenai River |
| Totals | 2,533 | 280.66 | 5 | 16.21 | 91 | 2,313 | |

Appendix 2. Cost of fish produced at the Kootenai Hatchery, January 1 to December 31, 1994.

| Species/Strain | Number produced | Pounds produced | Cost to produce | Cost/1,000 | Cost/lb |
|-------------------------------|-----------------|-----------------|-----------------|------------|------------|
| Kootenai white sturgeon, BY92 | 442 | 45.26 | \$11,458 | \$25,923 | \$253.16 |
| Kootenai white sturgeon, BY93 | 1,962 | 5.23 | \$34,375 | \$17,520 | \$6,573.00 |
| Totals | 2,404 | 50.49 | \$45,833 | \$19,086 | \$907.76 |

Appendix 3. Tag, length, weight, and sonic transmitter data for 41 age 2 white sturgeon released into the Kootenai River.

| PIT tag number | Floy tag number | Fork length | Total length | Weight | Sonic Transmitter number |
|---|-----------------|-------------|--------------|--------|--------------------------|
| Following data from fish released at the hatchery on July 29, 1994 at 9:00 a.m. | | | | | |
| 7F7E6A3C11 | 210 | 335 | 385 | 213.4 | |
| 7F7D376135 | 220 | 312 | 363 | 207.4 | |
| 7F7E6A3COB | 221 | 328 | 378 | 221.3 | |
| 7F7D402C38 | 223 | 226 | 312 | 132.8 | |
| 7F7D402C23 | 225 | 350 | 406 | 265.6 | |
| 7F7D27007F | 226 | 312 | 364 | 169.4 | |
| 7F7E6A40D | 228 | 319 | 365 | 211.2 | |
| 7F7D403A3D | 231 | 278 | 292 | 140.7 | |
| 7F7D39445F | 233 | 349 | 394 | 255.8 | |
| 7F7D266672 | 236 | 282 | 320 | 139.9 | |
| 7F7D315841 | 243 | 371 | 423 | 318.2 | |
| 7F7E6A3D42 | 247 | 373 | 439 | 304.2 | |
| 7F7D315F58 | 259 | 347 | 404 | 247 | |
| 7F7D435242 | 238 | 305 | 351 | 180.1 | |
| Following data from fish released at Ambush Rock on July 29, 1994 at 4:00 p.m. | | | | | |
| 7F7D3F6F5F | 235 | 269 | 308 | 120.7 | |
| 7F7D31431C | 237 | 311 | 352 | 198.2 | |
| 7F7D3F712E | 214 | 310 | 356 | 158.2 | |
| 7F7D424B72 | 230 | 318 | 364 | 197.4 | |
| 7F7D31421F | 222 | 323 | 366 | 194.3 | |
| 7F7D382D62 | 254 | 315 | 368 | 196.7 | |
| 7F7D37570D | 227 | 322 | 370 | 190.8 | |
| 7F7D376174 | 219 | 330 | 372 | 222.2 | |
| 7F7D315243 | 211 | 330 | 376 | 217.8 | |
| 7F7D314E7D | 232 | 328 | 378 | 236.3 | |
| 7F7D406576 | 217 | 332 | 379 | 229.9 | |

Appendix 3. Continued.

| PIT tag number | Floy tag number | Fork length | Total length | Weight | Sonic transmitter number |
|--------------------------------------|-----------------|-------------|--------------|---------|--------------------------|
| 7F7E6A4171 | 234 | 332 | 383 | 231.1 | |
| 7F7D382D6F | 239 | 335 | 386 | 215.5 | |
| 7F7D31657E | 212 | 338 | 390 | 228.4 | |
| 7F7E686046 | 257 | 337 | 393 | 229.4 | |
| 7F7D403B75 | 216 | 350 | 402 | 256.6 | |
| 7F7D315158 | 259 | 347 | 404 | 247 | |
| 7F7D310605 | 264 | 349 | 405 | 264.4 | |
| 7F7D31566C | 262 | 367 | 425 | 295.3 | |
| 7F7D3F6468 | 241 | 372 | 428 | 315.4 | |
| 7F7D375619 | 261 | 370 | 428 | 294.2 | |
| 7F7D315509 | 263 | 366 | 432 | 336.7 | |
| 7F7D315161 | 202 | 406 | 472 | 360.6 | |
| 7F7D402C1F | 218 | 313 | 356 | 179.3 | |
| a | | | | | 2272 |
| a | | | | | 2353 |
| a | | | | | 2344 |
| Total | | | | 5,437.1 | |
| ^a Currently missing data. | | | | | |

Appendix 4. Tag, length, weight, and sonic transmitter data for 40 age 2 white sturgeon released into the Kootenai River (Ferry Island, rkm 208), August 4, 1994.

| PIT tag number | Floy tag number | Fork length mm | Total length mm | Weight g | Sonic transmitter number |
|----------------|-----------------|----------------|-----------------|----------|--------------------------|
| 7F7D37603B | 42 | 384 | 425 | 349.2 | |
| 7F7D381021 | 78 | 410 | 469 | 428.7 | |
| 7F7D375249 | 145 | 402 | 468 | 417.6 | |
| 7F7D364673 | 149 | 420 | 484 | 415.2 | |
| 7F7D40754F | 150 | 406 | 487 | 439.1 | |
| 7F7D4D644C | 166 | 405 | 465 | 410.2 | |
| 7F7E6A400B | 197 | 412 | 478 | 401.1 | |
| 7F7D410314 | 212 | 600 | 710 | 1,750 | 2245 |
| 7F7D327E0D | 213 | 348 | 411 | 266.3 | |
| 7F7D37S062 | 215 | 294 | 333 | 121.2 | |
| 7F7D40394F | 224 | 363 | 421 | 288.6 | |
| 7F7D3944113 | 229 | 349 | 403 | 268.6 | |
| 7F7D376213 | 242 | 405 | 462 | 405.4 | |
| 7F7D403B5E | 244 | 423 | 494 | 440.2 | |
| 7F7D3F6770 | 245 | 369 | 425 | 302.2 | |
| 7F7D3830LC | 246 | 378 | 441 | 296.4 | |
| 7F7D37186C | 248 | 570 | 670 | 1,250 | 2425 |
| 7F7D267958 | 249 | 354 | 412 | 282.7 | |
| 7F7D36SA53 | 251 | 379 | 428 | 279.5 | |
| 7F7D440101 | 252 | 406 | 470 | 359 | |
| 7F7D3F6304 | 253 | 365 | 420 | 294.2 | |
| 7F7D371B0E | 255 | 368 | 434 | 311.7 | |
| 7F7D37613A | ^a 80 | 409 | 472 | 547 | |
| 7F7D3FS44A | 256 | 381 | 438 | 349.4 | |
| 7F7D402B1F | 266 | 432 | 510 | 536.2 | |
| 7F7D424E2A | 267 | 396 | 458 | 348 | |
| 7F7D3582072 | 268 | 409 | 482 | 1,750 | 2335 |

Appendix 4. Continued.

| PIT tag number | Floy tag number | Fork length | Total length | Weight | Sonic transmitter number |
|--|-----------------|--------------|--------------|--------------|--------------------------|
| 7F7D37602C | 102 | 472 | 547 | 694 | |
| 7F7D315005 | 280 | 623 | 731 | 1,750 | 2335 |
| 7F7D314C23 | 269 | 418 | 482 | 438.3 | |
| 7F7D39481A | 271 | 358 | 426 | 381.1 | |
| 7F7D424C4A | ^a | ^a | ^a | ^a | |
| 7F7D37613A | 272 | 383 | 450 | 358 | |
| ^a | ^a | ^a | ^a | ^a | |
| 7F7D402F62 | 273 | 416 | 485 | 416.5 | |
| 7F7D376114 | 274 | 412 | 478 | 453.5 | |
| 7F7D336B46 | 270 | 429 | 502 | 477.3 | |
| 7F7E6A3C30 | 276 | 355 | 410 | 424.5 | |
| 7F7D31SE41 | 277 | 370 | 429 | 293.6 | |
| 7F7D44000C | 283 | 580 | 670 | 1,250 | 2263 |
| ^a Presently unconfirmed data. | | | | | |

Appendix 5. Data for 10 age 2 white sturgeon from the Kootenai Hatchery (brood year 1992) released into the Kootenai River in Montana, downstream from Kootenai Falls on September 29, 1994. Each fish carries both a radio and a sonic transmitter. (Release locations: Jim Slaven's "Big Rock Island" - 5, and "Sturgeon Hole" - 5.)

| PIT tag number | Total length mm | Weight kilos | Transmitter ID | | Floy tag number |
|----------------|--------------------|-----------------|----------------|-------|--------------------|
| | | | Radio | Sonic | |
| 7F7D314E5F | 760 | 1.0 | 30.170 | 2363 | 00289 |
| 7F7D42491A | 730 | 1.5 | 30.1 | 2345 | 00290 |
| 7F7D372756 | 700 | 2.25 | 30.150 | 2426 | 00291 |
| 7F7F44424A | 736 | 1.75 | 30.070 | 2444 | 00292 |
| 7F7B097648 | 764 | 2.0 | 30.090 | 2354 | 00293 |
| 7F7B0F6856 | 683 | 1.5 | 30.010 | 2273 | 00294 |
| 7F7B091267 | 726 | 1.75 | 30.190 | 2336 | 00295 |
| 7F7F43602C | 693 | 1.50 | 30.030 | 2255 | 00296 |
| 7F7F427372 | 735 | 1.50 | 30.130 | 2264 | 00297 |
| 7F7F110272 | 731 | 1.50 | 30.050 | 2327 | 00298 |

Appendix 6. Fish feed used at the Kootenai Hatchery.

| Size | Source | Pounds | Cost/lb | Total cost |
|----------------------------|--------|----------|---------|------------|
| Rangen SoftMoist 1/32-inch | Rangen | 50.0 | .7676 | \$38.38 |
| Rangen SoftMoist 3/64-inch | Rangen | 150.0 | .7135 | \$107.03 |
| Rangen SoftMoist 3/16-inch | Rangen | 200.0 | .7019 | \$140.38 |
| Rangen SoftMoist 3/32-inch | Rangen | 100.0 | .6595 | \$65.95 |
| Rangen SoftMoist 1/8-inch | Rangen | 250.0 | .6595 | \$164.88 |
| Rangen SoftMoist 5/32-inch | Rangen | 300.00 | .6595 | \$197.85 |
| Totals | | 1,050.00 | | \$714.47 |

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
MACKAY FISH HATCHERY
1994**

**Bill Doerr, Fish Hatchery Manager I
Robert Hoover, Assistant Fish Hatchery Manager
Mel Hughes, Fish Culturist**

Included in the year's production were 14 lots, comprised of 5 species and 9 different strains, as follows:

Rainbow trout

Arlee (MT) (2 year classes)
Hayspur (ID) (R9) (2 year classes)
Troutlodge (WA)

Cutthroat trout

Westslope (2 year
classes) Henrys Lake

Brown trout

Saratoga (WY) (2 year classes)

Rainbow x Cutthroat trout hybrids

Kokanee salmon

Early (KE) run (2 year classes)
October (KO) run (Blue Mesa Reservoir, Colorado)

Early kokanee salmon Oncorhynchus nerka kennerlyi received as green eggs from the Deadwood Reservoir trap performed poorly in 1994, perhaps because of low water levels and high temperatures in Deadwood Reservoir during the summer of 1994. Eye-up dropped from 90% in 1993 to 60% in 1994.

In the spring of 1994, Hayspur rainbow trout O. mykiss were hatched as an experiment to test that strain's performance at this hatchery. Survivability to 1.5 inches in length was 86%. If necessary, this should prove to be a highly appropriate alternative to Arlee rainbow in the future.

WATER SUPPLY

During 1994, the water volume available for hatchery production stayed remarkably constant, considering that the area has been in a drought for seven years. Flows ranged from 18 to 23 cubic feet per second (cfs), which is comparable to historical levels. Prior to the earthquake of 1983, water temperature at the Mackay Hatchery was said to be a constant 52°F. After that earthquake, it became apparent that three springs supplied water to the hatchery; one at 49°F, one at 51 °F, and one at 54°F. For some time after the earthquake, the temperature in the production raceways remained at 54°F. Since that time, the water temperature in those raceways

has followed a downward trend, reaching 49°F during 1994. This has been the result of decreasing flows in the 54°F spring, and increasing flows in the 49°F spring. This may be a warning of changing flows in the future.

HATCHERY IMPROVEMENTS

The roof on the shop/feed storage building was replaced with galvanized roofing. The hatchery effluent settling and evaporation pond was enlarged and deepened. A safety fence was built around the tailrace for the safety of employees and visitors. The 400-gallon fish hauling tank was remodeled with a Point 4 oxygen system to increase hauling capacity and enhance fish health at release. As part of the hatchery maintenance program, the exterior of the garage at residence #1 was cleaned, scraped, and repainted. Sunscreens were built to calm wilder strains of fish in the large raceways. Nursery troughs were patched in the hatchery building. Aluminum-framed, perforated-plate fish screens were built for the large and small raceways. Large raceway walls were patched as part of the overall maintenance program.

FUTURE NEEDS

A retaining wall, or clay bed, will need to be installed between the spring and residence #1. That residence is below the level of the spring and is in constant danger of flooding. The spring cobble area will need cleaning with a backhoe. The furnace and wood stove in residence #3 are near the end of their useful life. The siding on residence #3 is now 36 years old. It is cracking and warping and needs to be replaced. Additional replacement incubators and nursery troughs are needed for the hatchery building. Residence #3 has never had a garage for the employee living in that house. As the Mackay area has severe winters, a garage should be built.

FISH STOCKED

Fingerling of various species and strains were stocked in 5 regions of Idaho (Appendix 1). These put-grow-and-take fish numbered 3,491,734 fish weighing 48,225.6 pounds.

Catchable rainbow trout (8 inches +) were stocked in the Upper Snake and Salmon regions. These put-and-take fish numbered 139,140 fish weighing 76,028 pounds.

The fish transport tanker trucks assigned to the Mackay Hatchery traveled on 134 fish stocking trips during the year, and logged over 35,000 miles. Transport tankers assigned to Fish Transportation hauled eight loads during the year. Sixty-one high mountain lakes in the Magic Valley and Upper Snake Regions were stocked using helicopters.

In addition to Mackay's normal production of 11-inch catchables, 16,233 rainbow catchables ranging from 14 to 16 inches in length (nicknamed "Mackay Magnums") were stocked in Ririe Reservoir. This has been found to produce higher return-to-the-creel than stocking 70,000 smaller catchables, as was done in past years.

EGGS SHIPPED

Thirty-five thousand eyed early (Deadwood) kokanee eggs were shipped to the Troutlodge hatchery at Hood River, Oregon.

FISH SPAWNING

The run of October kokanee in Paulina Lake, Oregon was much later, and numbers were down significantly from past years. No eggs were available from that source this year.

FISH FEED

Fish feed used during the year totaled 119,872 pounds at a cost of \$39,435.08. Feed conversion averaged 1.02 pounds of feed per pound of fish produced. Feed cost per pound of fish produced was \$0.3355. Feed cost per inch produced was \$0.0029.

BioDiet, BioDry 1000, BioDry Trout, Rangen SoftMoist diet, and Nelson's Sterling Silver Cup dry and SoftMoist trout and salmon diets were used, depending on the different nutritional needs of different strains.

PUBLIC RELATIONS

Approximately 800 people toured the hatchery during the year. Due to the remote location and unfavorable climate of the hatchery, few people actually seek it out. Most are hunters and fishermen who visit here incidental to other activities.

Hatchery tours were given to two school groups. An on-camera interview was given to the local NBC television affiliate. A presentation was given to an elementary school group at the Arco Library explaining anadromous fish migration issues. The hatchery crew and the local conservation officers participate in Idaho's "Adopt-A-Highway" litter control program. Six miles of Highway 93 along Mackay Reservoir are cleaned twice yearly.

FISH FIN CONDITION

Using the "Ashton Method" for measuring fin condition of production fish raised at the Mackay Hatchery, measurements were taken several times during the planting season.

Fins measured 60% of wild fish fins for Arlee rainbow catchables. Fingerling fins measured 73% of wild fish fins for Hayspur rainbow; 61% of wild fish fins for westslope cutthroat; 82% of wild fish fins for brown trout; 89% of wild fish fins for rainbow X cutthroat hybrids; 78% of wild fish fins for Henrys Lake cutthroat, and 81% of wild fish fins for early kokanee.

FISH MARKING

Ten percent (100,000) of the Henrys Lake cutthroat trout O. clarki stocked in Henrys Lake were adipose fin-clipped prior to stocking.

ACKNOWLEDGMENTS

During 1994, the Mackay Hatchery crew included Bill Doerr, Fish Hatchery Manager I; Robert Hoover, Assistant Fish Hatchery Manager; Mel Hughes, Fish Culturist; and at different times, Jason Rheinhardt, Terry Warner, and Rebekah Steffler, Biological Aides. Manpower available and expended totaled 36 permanent and 15 temporary man-months.

Appendix 1. Fish production at Mackay Fish Hatchery, January 1 to December 31, 1994.

| Species/Strain | Lot number | Source | Received as | Number/lb received or carried over | Yield (Number/lb) | Destination, Comments |
|---------------------------------|------------|-----------------------|-------------|------------------------------------|------------------------|---|
| Hayspur rainbow | 4-U-Id-R9 | Hayspur | eyed eggs | 28,750/ eggs | 24,812/ 190 | Experimental rearing |
| Hayspur rainbow | 5-U-Id-R9 | Hayspur | eyed eggs | 289,145/ eggs | 245,773/ alevins | 1996 catchables, Hagerman Hatchery, 1995 |
| Arlee rainbow | 3-En-RA | Ennis NFH | eyed eggs | 108,000/ 36,000 ^a | 115,334/ 71,628 | 1994 catchables |
| Arlee rainbow | 4-En-RA | Ennis NFH | eyed eggs | 135,000/ 45 ^a | 131,800/ 34,400 | 1995 catchables, 1994 fingerlings |
| Kamloops Troutlodge | 4-U-Id-20 | Nampa | fry | 22,040/ 40 | 22,900/ 45,8 | High mountain lakes |
| westslope cutthroat | 3-U-Id-C2 | McCall | fry | 20,600/ 317 ^a | 20,000/ 1,525 | Payette Lake net pen 1994 |
| westslope cutthroat | 4-U-Id-C2 | McCall | fry | 19,000/ 28,3 | 16,000/ 157 | Payette Lake net pen 1995 |
| westslope cutthroat Henrys Lake | 4-U-Id-C3 | Henrys Lake | eyed eggs | 1,564,998/ eggs | 1,090,174/ 16,370.8 | Region 6 high mountain lakes, Henrys Lake, Sublett |
| Plymouth Rock brown trout | 3-Sr | Saratoga NFH Wyoming | eyed eggs | 116,000/ 36 ^a | 115,951/ 1,576 | Regions 4 and 6 fingerlings, 1994 |
| Plymouth Rock brown trout | 4-Sr | Saratoga NFH Wyoming | eyed eggs | 205,269/ eggs | 165,000/ alevins | Regions 4, 5, and 6 fingerlings, 1995 |
| rainbow x cutthroat | 4-U-Id-RC | Henrys Lake | eyed eggs | 1,232,223/ eggs | 814,900/ 11,920 | Regions 3 and 6 |
| Deadwood kokanee | 3-U-Id-KE | Deadwood Reservoir | green eggs | 1,420,000/ 675 ^a | 1,402,997/ 16,598 | Regions 2, 3, 4, 5, and 6, 1994 |
| Deadwood kokanee | 4-U-Id-KE | Deadwood Reservoir | green eggs | 1,136,752/ eggs | 500,000/ 43 | Regions 2, 3, 4, 5, and 6, 1995 (+35,000 eyed eggs shipped) |
| Blue Mesa kokanee | 4-U-Co-KO | Roaring Judy Colorado | eyed eggs | 605,088/ eggs | 500,000/ alevins | Salmon Falls Reservoir, Lucky Peak Reservoir, 1995 |

^aDenotes numbers and pounds of fish carried over from previous year.

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
MCCALL FISH HATCHERY
1994**

Steven T. Kammeyer, Assistant Fish Hatchery Manager

INTRODUCTION

McCall Fish Hatchery is located within the city limits of McCall, approximately 1/4-mile downstream of Payette Lake, adjacent to the North Fork of the Payette River. This facility was renovated by the U.S. Army Corps of Engineers in 1979. Its primary objective is to produce one million summer chinook salmon Oncorhynchus tshawytscha smolts annually. Anadromous funding is provided by the U.S. Fish and Wildlife Service. Facility secondary objectives pertain to resident programs. Funding for the resident fisheries program (April 1 to September 30) is provided from Idaho Department of Fish and Game (IDFG) license sales revenue.

Payette Lake provides all of McCall Fish Hatchery water requirements. Two water intakes are available, which provide limited water temperature control through mixing. The surface intake is located at Lardo Dam at the outlet of Payette Lake. The subsurface intake is located approximately 1/4-mile into the lake at a depth of 50 feet. A 2-foot diameter constriction in the 3-foot diameter mainline limits maximum flow capacity to 20 cubic feet per second (cfs).

Incubation capacity consists of 26 eight-tray Heath style incubator stacks. Additional incubators can be plumbed into several of the early rearing vats if more space is required. Early rearing is accomplished through the use of 14 indoor vats. Each early rearing vat is 40 feet long and 4 feet wide. Outside rearing consists of two concrete ponds 196 ft x 101 ft x 4 ft used for chinook rearing, and one collection basin 101 ft x 15 ft x 4 ft which straddles the base of the two ponds. During the summer, the collection basin is used for holding catchable trout for redistribution.

Major resident program objectives are:

- Redistribute up to 80,000 catchable rainbow trout O. mykiss annually.
- Operate Fish Lake satellite trap for the collection of westslope cutthroat trout O. clarki lewisi eggs.
- Hatch and rear westslope cutthroat, rainbow trout, and domestic Kamloops fry for redistribution into high mountain lakes in regions 1, 2, 3, 7, and McCall Subregion.
- Maintain and provide technical assistance for Payette Lake net pens.
- Maintain the statewide high mountain lakes stocking request database.
- Provide assistance to McCall subregional fisheries management as needed.

FISH PRODUCTION

Fish Lake Broodstock

Westslope cutthroat trout used for high mountain lake requests and net pen rearing are primarily obtained from the naturalized broodstock spawning project at Fish Lake. Fish Lake is located approximately seven miles west of McCall. It is on Little Creek, a tributary to the Little Salmon River. The satellite facility is equipped two 6 ft x 22 ft x 4 ft holding ponds, a 4 ft x 12 ft x 4 ft fish trap, and a velocity barrier. Westslope cutthroat trout trapping and spawning operations typically extend from early April through mid-May.

Westslope cutthroat trout fry originating from Fish Lake are outplanted as fry, except for a portion set aside for net pen rearing the following year. These fish are transferred to Mackay Fish Hatchery in the fall to overwinter.

The Fish Lake trap operated from April 14 through May 20, 1994. A total of 622 westslope cutthroat trout were trapped. Of these, 246 were males (39.5%) and 376 were females (60.5%). Average total lengths for males and females were 362.7 mm and 356.4 mm, respectively (Appendix 1).

Spawntaking operations took place from April 28 to May 20, 1994. A total of 276 females were spawned producing an approximate green egg take of 189,600 eggs (Appendix 2). Average fecundity was 687.0 eggs per female. The average eye-up reported for these eggs was 44.9%; although due to the high number of "blanks," eye-up was actually lower. Resulting fry available for hatchery programs numbered 43,760. Two main problems occurred which may account for the poor eye-up and subsequent above normal mortalities in incubation trays. First, sperm quality was very poor. Males did not appear to be ready when females were. Second, water temperatures were much higher than normal. During the largest spawntake, water temperatures peaked above 70°F.

Westslope cutthroat trout stocked back into Fish Lake for future broodstock have been fin-clipped for identification since the 1986 release. Of the 622 returning adults in 1994, 86 fish with fin clips (13.8%) returned to the trap. This is considerably higher than recent years; 4.5% in 1993, 5.9% in 1992, and 4.6% in 1991. However, the total number of fish trapped has been steadily declining.

On October 4, 1,041 catchable size westslope cutthroat trout from the net pens were released into Fish Lake at an average size of 6.4 fish/lb (191 mm fork length). Eroded fins will be used for their identifying mark. These fish were added to help compensate for what appears to be a declining population over recent years. An

additional 3,262 left ventral-clipped westslope cutthroat trout fry were planted into Fish Lake on October 31. These fish averaged 325 fish/lb (53.3 mm fork length). In both cases, the fish added to Fish Lake represented a random selection of spawning lots from 1993 and 1994 (Appendix 3).

High Mountain Lake Stocking

McCall Hatchery reared westslope cutthroat, Henrys Lake strain cutthroat trout, Hayspur strain rainbow trout, and domestic Kamloops for high mountain lake stocking in 1994. Means of stocking included backpacking, aerial plants, and truck plants. All of the high mountain lake plants were distributed within the six-month resident funding period.

Size is critical to the efficiency of the high mountain lake stocking program. A desirable stocking size is 800 to 1,200 fish/lb. Shipments of rainbow and Kamloops eggs are scheduled to match the westslope cutthroat trout egg eye-up of early June. This way, all of the fry are ready to be planted in the same time frame, reducing the amount of flight time to complete all plants.

Due to the poor egg take from Fish Lake, fry survival, and no availability of Arctic grayling Thymallus arcticus or golden trout O. aguabonita, only 31% of all stocking requests were met in 1994 (Appendix 3.). Additionally, stocking efforts were hampered greatly by forest fire restrictions on airspace and smoke conditions.

A total of 122 lakes were stocked with fry in 1994. Of these, 106 lakes were stocked at a total cost of \$3,847.00 in flight time, or \$36.29 per lake stocked in this manner. The first two flights were aborted due to bad weather over the lakes, which cost \$487.20 in flight time. Volunteers stocked 14 of these lakes for a savings of \$443.80 in comparable flight time costs.

Catchable Redistribution

During the period May 18 to September 28, 1994, a total of 62,700 catchable size domestic Kamloops, originating from Nampa Fish Hatchery, were outplanted into 31 bodies of water in the McCall area. Local road closures due to area fires and high water temperatures in some rivers prevented completing all catchable fish plants until later than normal this year.

Net Pens

This was the fifth year for net pen production of westslope cutthroat trout in Payette Lake. The net pen project is sponsored by Trout Unlimited with technical assistance provided by McCall Hatchery personnel. Trout Unlimited members have continued their support of this project through providing assistance in loading the nets, purchasing all of the feed used, purchasing a replacement belt feeder, and feeding the fish daily. Two nets, 30 feet deep, were used again this year. No significant environmental-caused mortalities were experienced. Total production resulting from the net pens in 1994 was approximately 12,836 westslope cutthroat trout, or 1,857 pounds.

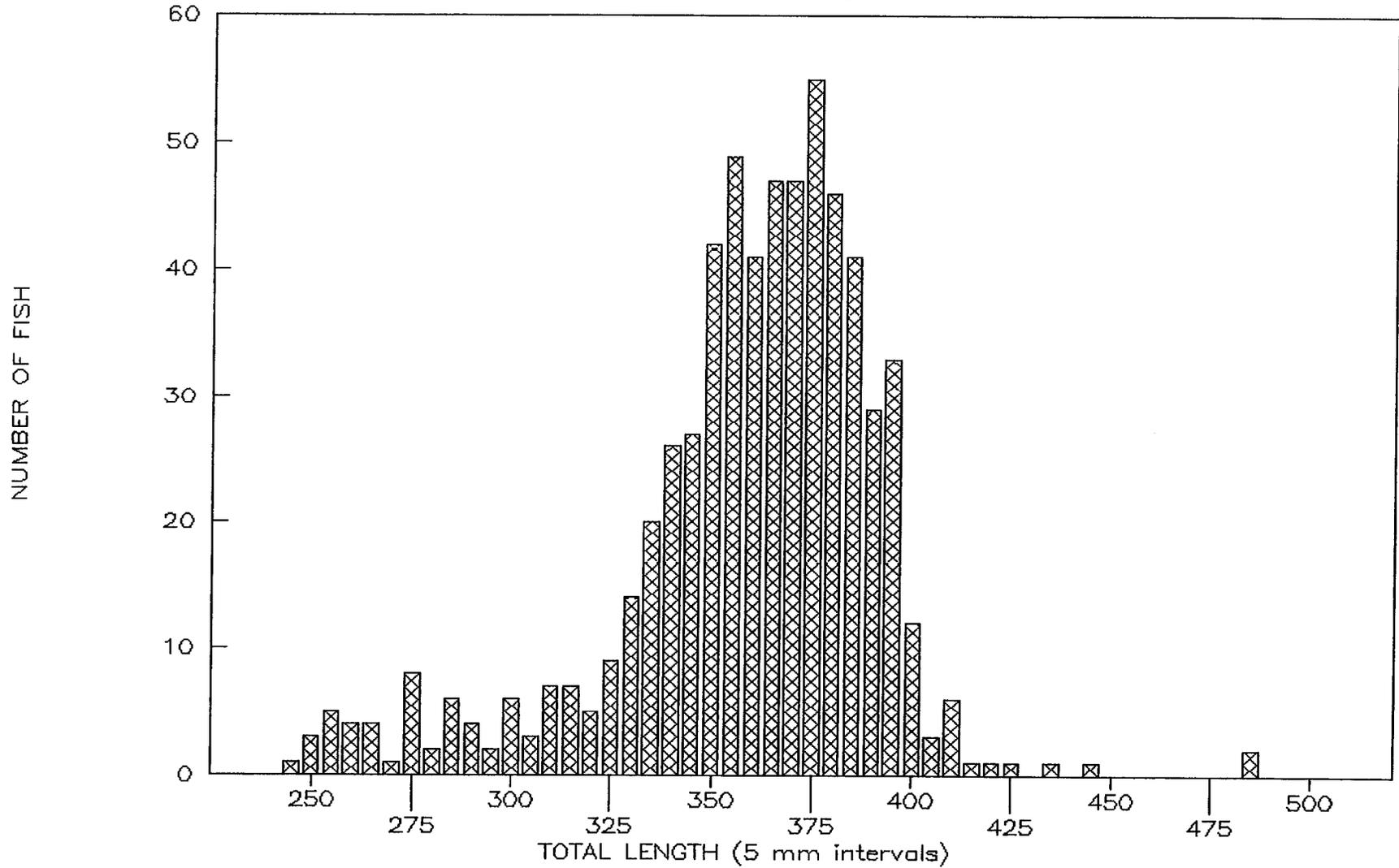
On May 10, Mackay Fish Hatchery personnel loaded approximately 20,000 westslope cutthroat trout into the net pens. These fish originated from Fish Lake and were set out at an average size of 13.1 fish/lb. Both nets were "thinned" on August 11. At this time, approximately 1,795 fish were released at an average size of 11.3 fish/lb (178.3 mm fork length). The final release occurred on October 4. An estimated 5,000 fish were released from each net at an average size of 6.4 fish/lb (191.0 mm fork length). An additional 1,041 westslope cutthroat trout were taken from the nets and transported to Fish Lake as broodstock replacement at this time.

An estimated feed conversion of 2.42 pounds of feed to produce 1 pound of fish was experienced for net pen rearing. There was no solid fish inventory available for initial net loading, and the maximum number of fish available was used in feed conversion calculations.

McCall Fish Hatchery transferred 19,000 westslope cutthroat trout (672.5 fish/lb) to Mackay Fish Hatchery on September 26, 1994 to overwinter. These fish represented a cross-section of all fish spawned at Fish Lake and will be used to stock the net pens in 1995.

CUTTHROAT TROUT LENGTH FREQUENCY

FISH LAKE - 1994



Appendix 1. Cutthroat trout length frequency, McCall Hatchery, 1994.

Appendix 2. Results of westslope cutthroat trout spawntake, Fish Lake, McCall Hatchery, 1994.

| Females spawned | Number of green eggs | Percent eye-up | Number of eyed eggs | Average fecundity |
|-----------------|----------------------|----------------|---------------------|-------------------|
| 276 | 189,600 | 44.9 | 85,188 | 687.0 |

Appendix 3. Westslope cutthroat trout outplants and returns at Fish Lake, 1986 to 1994.

| Year released | Number released | Mark type | Total marks trap | Total fish trap | LV | AD | RV | RP | LP |
|-----------------|-----------------|-----------|------------------|-----------------|----|----|----|----|----|
| 1986 | 5,490 | LV | 0 | 2,091 | 0 | 0 | 0 | 0 | 0 |
| 1987 | 4,000 | AD | 0 | 4,486 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 3,310 | RP | 1 | 2,708 | 0 | 0 | 0 | 0 | 1 |
| 1989 | 4,000 | RV | 4 | 2,197 | 4 | 0 | 0 | 0 | 0 |
| 1990 | 4,000 | LV | 103 | 1,437 | 91 | 9 | 2 | 1 | 0 |
| 1991 | 4,200 | AD | 63 | 1,480 | 21 | 33 | 2 | 4 | 3 |
| 1992 | unknown | RV | 58 | 1,145 | 20 | 13 | 15 | 6 | 4 |
| 1993 | 4,145 | AD | 41 | 980 | 20 | 0 | 20 | 0 | 1 |
| 1994 fry | 3,262 | LV | 86 | 622 | 69 | 7 | 9 | 1 | 0 |
| 1994 fingerling | 1,042 | EF | | | | | | | |

EF = eroded fins, LV = left ventral, AD = adipose clipped, RP = right pectoral, LP = left pectoral, RV = right ventral.

Appendix 4. High mountain lake stocking requests by region, 1994.

| Region | Planted/Transferred | Requested (all species) | Percent of request met |
|----------|---------------------|-------------------------|------------------------|
| 1 | 5,614 | 33,750 | 16.6 |
| 2 | 20,000 | 52,250 | 38.3 |
| 3B | 11,400 | 33,500 | 34.0 |
| 3M | 39,152 | 83,700 | 46.8 |
| 7 | 0 | 81,000 | 0.0 |
| Net Pens | 19,000 | 20,000 | 95.0 |
| Total | 95,166 | 304,200 | 31.3 |

Appendix 5. Total production/distribution at McCall Hatchery, 1994.

| Species | Eggs/fish received | Fish planted | Pounds produced/stocked | Cost/pound | Cost/fish |
|--|--------------------|--------------|-------------------------|------------|-----------|
| HIGH MOUNTAIN LAKES | | | | | |
| westslope cutthroat (Fish Lake) | 189,600 green | 24,760 | 28.82 | \$27.16 | \$0.05 |
| westslope cutthroat (Montana) | 100,470 eyed | 17,800 | 14.79 | \$27.16 | \$0.05 |
| Hayspur rainbow trout | 61,350 eyed | 18,250 | 23.62 | \$27.16 | \$0.05 |
| domestic Kamloops | 13,000 eyed | 4,615 | 7.69 | \$27.16 | \$0.05 |
| Henrys Lake cutthroat | 4,400 fry | 4,390 | 12.45 | \$27.16 | \$0.05 |
| domestic Kamloops | 6,350 fry | 6,350 | 54.26 | \$27.16 | \$0.05 |
| Subtotal | 375,170 | 76,165 | 141.63 | \$27.16 | \$0.05 |
| Note: Cost based on flight time expense. | | | | | |
| NET PENS | | | | | |
| westslope cutthroat (1995) | | 19,000 fry | 28.3 | n/a | n/a |
| westslope cutthroat (1994) | 20,000 fingerling | 12,836 | 346/1,872.7 | n/a | n/a |
| CATCHABLE REDISTRIBUTION | | | | | |
| domestic Kamloops | 62,850 catchable | 62,700 | 18,731 | n/a | n/a |
| Total | | 170,701 | 20,773.63 | \$2.44 | \$0.30 |
| Note: Cost based on average resident program budget of \$50,600. | | | | | |

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
MULLAN FISH HATCHERY
1994**

Mary Van Broeke, Biological Aide

INTRODUCTION

The Mullan Hatchery is a resident species redistribution station located four miles east of Mullan, Idaho. The hatchery buildings and grounds are owned by the Shoshone County Sportsmen's Association. Maintenance of the physical plant is funded by Shoshone County. The Idaho Department of Fish and Game funds personnel costs, production costs, and equipment with fishing and hunting license fee revenue. The facility operates as a satellite of the Clark Fork Hatchery with one temporary employee on station year-round.

The hatchery receives water from the South Fork of the Coeur d'Alene River and the Little North Fork of the Coeur d'Alene River. Two (6 ft x 65 ft) concrete raceways, as well as one (12 ft x 65 ft) concrete raceway and three dirt ponds approximately (30 ft x 100 ft), are used to hold fish prior to stocking to the Coeur d'Alene and St. Joe river drainages. One dirt pond has been developed as a show pond complete with a visitor's access deck, information board, and a feed dispenser.

The Mullan facility plays a vital role in supporting the put-and-take rainbow trout Oncorhynchus mykiss fishery. From this location, daily trips are made onto the Coeur d'Alene and St. Joe rivers, from May to September, providing the frequent stocking service needed to support such a fishery.

HATCHERY IMPROVEMENTS

A secondary exit to the crew's quarters, consisting of a landing and exterior stairway, was constructed to comply with State of Idaho safety requirements. Shoshone County provided \$350.00 in materials, the Idaho Department of Fish and Game funded \$420.00 for labor, with the Shoshone County Sportsmen's Association donating \$210.00. The second story apartment had previously had only one fire escape route, which went past the heating stove and through the kitchen.

FISH STOCKED OR TRANSFERRED

Approximately 54,000 rainbow trout > 9 inches were released in waters of the Coeur d'Alene, St. Joe, and St. Maries river drainages from May to August to support a put-and-take fishery. That was a 2,000-fish increase over the stocking request to support the addition of Pine Creek Pond in 1994. The trout were transferred at full release size from the American Falls and Hayspur hatcheries in southern Idaho to holding ponds at the Mullan Hatchery. From there, hatchery personnel loaded the fish

into a 500-gallon pick-up truck mounted tank and delivered them to hundreds of miles of stream. The distribution schedule requires 8- to 10-hour trips, 4 to 5 days each week, or 59 days on the road out of 70 available working days in the summer season. While lake stocking is usually accomplished with single large releases, river stocking is much more labor intensive. Even relatively small numbers of fish require multiple stops to distribute the fish effectively for sportsmen's access.

PUBLIC RELATIONS

The Mullan Hatchery is located adjacent to a popular Shoshone County "day use" park. As a direct result, the hatchery receives a much higher visitor load than would be expected due to its remote location. This was a record breaking year with an estimated 9,000 visitors in 1994, including several tour groups from local schools.

One tour that had a very positive response involved a sixth grade Mullan Elementary school class. The students participated in loading a truck from the hatchery pond. The class then traveled by bus to Gold Creek Pond where they helped in the release of those fish.

The hatchery maintains a covered visitor information center with a map of stocking areas and information about the special harvest regulations in the Coeur d'Alene River and St Joe River drainage.

On June 11, one of the dirt rearing ponds was stocked with rainbow trout to provide fishing for a Free Fishing Day clinic. Personnel from the Panhandle Region, U.S. Forest Service, and the Shoshone County Sportsmen's Association provided training and advice to more than 136 children that day. The location was particularly beneficial in providing access for persons having limited mobility. The Fishing Clinic received good reviews in the local newspaper and boosted the Department's image in the Silver Valley.

SPECIAL PROJECTS

Mullan Hatchery assisted in the fall chinook salmon O. tshawytscha spawning program on Wolf Lodge Creek. In addition to assisting with the egg take, the manager transported adults to support a water quality evaluation on the Coeur d'Alene river. Adult male salmon were selected, marked with radio transmitters, and released in the North Fork of the Coeur d'Alene River. The fish were observed to evaluate avoidance or non-avoidance of the South Fork Coeur d'Alene River in their upstream spawning movement.

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
NAMPA FISH HATCHERY
1994**

**Rick Alsager, Fish Hatchery Manager II
Dan Baker, Assistant Fish Hatchery Manager
Rob Morris, Fish Culturist
Jeff Heindel, Bio-Aide**

INTRODUCTION

Nampa Fish Hatchery is a resident trout rearing facility located one mile south of Nampa. The water supply includes eight artesian wells with a combined flow of 18 to 40 cubic feet per second (cfs) of 59°F water. Built in 1975 and purchased by the Idaho Department of Fish and Game in 1982, fish rearing facilities consist of a hatchery/crews quarters building containing four upwelling incubators and four early rearing vats, outside rearing tanks including 16 fry raceways, three fingerling/broodstock raceways, and 10 production raceways. Up to 16 additional upwelling incubators can be used in the fry raceways to increase egg incubating capacity. A settling pond treats flows from the production units before discharge into Wilson Springs Ponds and Wilson Springs Drain.

FISH PRODUCTION

Nampa Hatchery produced 1,101,088 fish weighing 201,992 pounds during the 1994 fish year. Broodstock production and fish transferred to other hatcheries are included in the total number and pounds produced. Kamloops and rainbow trout Oncorhynchus mykiss comprised 83% of the fish stocked from Nampa Hatchery. In addition, brown trout Salmo trutta, Lahontan cutthroat trout O. clarki henshawi and chinook salmon O. tshawytscha were produced at Nampa Hatchery during 1994 (Appendix 1).

The total number of each species/strain stocked is listed in Appendices 2, 3, 4 and 5. A total of 1,488,749 eggs were received during the 1994 fish year (Appendix 6).

FISH STOCKED/TRANSFERRED

Nampa Hatchery personnel stocked 1,460,528 fish, weighing 181,969 pounds, during the 1994 fish year. The Southwest Region received 322,098 catchable trout weighing 99,553 pounds. A total of 295 planting trips were made by Nampa Hatchery during 1994.

A total of 62,850 catchable Kamloops rainbow trout (Troutlodge stock) weighing 18,777 pounds were transferred to McCall Hatchery. In addition, 6,094 Kamloops (Troutlodge) fingerlings weighing 52 pounds were transferred to McCall Hatchery. Mackay Hatchery received 22,035 Kamloops (Troutlodge) fry weighing 40

pounds. Nampa Hatchery also transferred 4,030 Hayspur rainbow trout and Kamloops (Hayspur stock) broodstock (Appendix 5) weighing 6,235 pounds to Hayspur Hatchery. Surplus broodstock were combined with catchable size trout and stocked in the Southwest Region waters.

FISH TRANSPORTATION

Fish transport operators stationed at Nampa Hatchery stocked waters in all regions throughout the state of Idaho and transferred fish to and from eight different state/national fish hatcheries. They made 84 trips throughout Idaho covering 32,000 miles.

Gary Ady and Dick Bittick stocked rainbow trout fingerlings from Lyons Ferry Hatchery (227,272 fish, 6,509 pounds) into Clearwater Region waters and stocked surplus steelhead trout O. mykiss from Hagerman National Fish Hatchery into Southwest Region waters (266,500 fish, 8,050 pounds). Gary and Dick stocked chinook salmon pre-smolts and smolts for Clearwater Hatchery and the Nez Perce Indian Tribe. Dick transported and stocked surplus steelhead broodstock from Dworshak National and Oxbow hatcheries releasing the adults into the Payette and Boise rivers.

BROWN TROUT

Two shipments of brown trout eyed eggs were received during November 1993. The first shipment of 100,000 eyed eggs arrived from Saratoga National Fish Hatchery. From this group, a total of 50,095 fingerlings were released in the Panhandle and Southwest Regions for an overall survival rate of 50.1% from eyed egg to plant. The second group of brown trout eyed eggs arrived from Manchester Hatchery in Iowa. From this group of 15,000 eyed eggs, 10,920 fingerlings were released in the Southwest Region for an overall survival rate of 72.8% from eyed egg to plant.

LAHONTAN CUTTHROAT TROUT

During the 1994 fish year, Nampa Hatchery stocked 187,825 Lahontan cutthroat trout into lakes and reservoirs located in the Southwest and Upper Snake regions. All Lahontan cutthroat eggs received this year came from Omak Hatchery in Washington. The Southwest Region fish were stocked as fry (Appendix 2), while the

Upper Snake Region's fish were stocked as fingerlings into Mud Lake and Island Park Reservoir (Appendix 3). The stocking of the Southwest Region's reservoirs (Grasmere, Shoofly, Little Blue, Paine Creek, and Bybee) should be evaluated. Paine Creek Reservoir was reported dry during the late summer months, and water levels of the other four reservoirs were unknown.

GERRARD KAMLOOPS TROUT

Nampa Hatchery received one group of Gerrard Kamloops fingerlings from Canada, transported by personnel from Clark Fork Hatchery in 1994. A total of 8,000 fingerlings arrived on March 15 and were transferred to early rearing raceway A6 on March 17. Later it was determined that proper disease protocols were not followed, and the entire lot was destroyed on March 31, 1994. As a precaution to prevent any possible disease outbreak from this group, the sac-fry in early rearing raceway A5 (25,000 Hayspur Kamloops) and the fingerlings in early rearing raceway A7 (16,000 Hayspur rainbow fingerlings weighing 320 pounds) were destroyed.

FISH FEED

A total of 220,544 pounds of feed was fed during 1994 at a cost of \$72,340.12 (Appendix 7). Rangen's Inc. made up 97% of the feed purchased by weight, with Bioproducts making up the remaining 3% (Appendix 8). The overall feed conversion was 1.09 pounds of feed fed to produce 1 pound of fish.

FIN EVALUATION

Nampa Hatchery personnel evaluated fin conditions on several groups of fish in 1994. Fin evaluations were done during fin clipping operations to prevent undue handling. Hayspur rainbow and Troutlodge Kamloops production fish averaged between 65% and 70% fin retention. Our numbers were lower than in previous years due to loading conditions being higher at certain times of their rearing cycle. Hayspur rainbow and Troutlodge Kamloops fingerlings were slightly higher at 70% to 75% retention; however, these were also affected with higher loading densities. All specialty fish (fall chinook salmon, brown trout, and Lahontan cutthroat trout) averaged about 85% fin retention, a result of being raised at lower densities, provided with shade structures, and fed a soft-moist diet throughout their rearing cycle.

FISH SPAWNING

Deadwood (Early Kokanee)

Nampa Hatchery continues to operate the early kokanee salmon Oncorhynchus nerka kennerlyi trapping and spawning project at Deadwood Reservoir. Installation of weirs and traps began on August 9, 1994. No weirs were installed on Trail Creek, Wild Buck Creek, or Basin Creek. The weir, trap, and velocity barrier on the Deadwood River was completed on August 10, 1994. The first kokanee adults were trapped on August 12, 1994, and trapping continued through September 20, 1994. The main weir and trap was removed on September 20, with the velocity barrier remaining in place preventing upstream migration.

All fish were spawned at the trap site. An egg yield of 1,134,716 eggs were taken from 3,895 females for a fecundity rate of 291 eggs per female (Appendix 9). Average total length of kokanee females was 249.7 mm, with males averaging 256.9 mm (Appendix 10). Fecundity and average total length increased significantly in 1994, but remained below historical averages (Appendix 10). Percent survival to the eyed egg stage was 59.8%. The low survival rate could be contributed to a number of factors: low water year; high water temperatures in the Deadwood River; or a decrease in the number of returning kokanee.

Eggs were shipped to Mackay Fish Hatchery via fixed-wing aircraft. Shipping techniques were identical to those used during previous years and, as in 1993, Idaho Fish and Game contracted out the flying service with McCall Air Taxi. A total of 100 surplus adult kokanee were out-planted into the ponds at the Morrison Knudsen Nature Center.

HATCHERY IMPROVEMENTS

1994: Several important improvements were implemented at Nampa Hatchery during

- Built and installed new covers for the headrace (hatchery inflow) that supplies water to the production, broodstock, and early rearing raceways.
- Completed bird screen project over our production and broodstock raceways.
- Constructed an additional bird screen structure enclosing our early rearing raceways.

- Purchased aluminum bar rack screens for the lower section of our production raceways.
- Purchased ten additional belt feeders for our early rearing raceways.
- Purchased air conditioners for Residences #2 and #3.
- Constructed a portable clipping system.

Hatchery improvements scheduled for 1995 include:

- Asphalt paving of the hatchery parking lot and the road in front of Residences #1 and #2.
- Purchase a portable welder.
- Replace wooden planks with grip-strut grating at the lower section of production raceways.
- Cover the tailrace with expanded metal.
- Fence back yard areas between residences #2 and #3 for privacy and security.
- Purchase aluminum damboards for the early rearing raceways.
- Purchase two sheds for equipment storage.

PUBLIC RELATIONS

As in past years, Nampa Hatchery was a focal point for many visitors, tours, and special groups. In 1994, an estimated 2,000 tourists visited the hatchery, mostly through the late spring and summer months. A total of 61 guided tours were given to area school, church, and boy scout groups. The disabled veterans were allowed to fish the settling pond six times during the summer months, as were the handicapped patients from the Idaho State School, who fished the pond on 12 trips. The settling pond was also opened to fishing on Free Fishing Day. The Nampa Hatchery and Southwest Region personnel hosted the Free Fishing Day clinic, which saw 259 visitors/fishermen catching an average of 4 fish/person (the largest fish caught was a 4.5-pound rainbow trout). Free Fishing Day at Nampa Hatchery was enjoyed by many and needs to be continued in the future. The total visitor count for 1994 was between 5,000 and 6,000 visitors.

ACKNOWLEDGEMENTS

Nampa Hatchery staff for 1994 included Rick Alsager, Hatchery Manager II; Dan Baker, Assistant Hatchery Manager; Rob Morris, Fish Culturist; Gary Ady, Fish Transport Operator; and Dick Bittick, Fish Transport Operator, who filled a vacant position July 1, 1994. Bio-aides for 1994 included Dev Miller, Jeff Heindel, John Dean, Chuck Keister, Boone Petersen, and Howard Garwick. Two students from Borah High School and two students from Boise High School participated in work study programs and their help was greatly appreciated.

Appendix 1. Fish requested and produced at Nampa Hatchery during 1994.

| Species/Strain | Size | Production goal | Actual production | % of goal achieved |
|--|-------------|-----------------|-------------------|---------------------|
| Lahontan cutthroat | 1-3 inches | 21,000 | 42,000 | 200.0% |
| Kamloops trout | 1-3 inches | 70,000 | 79,950 | 114.2% |
| brown trout | 3-5 inches | 59,500 | 61,015 | 102.5% |
| Lahontan cutthroat | 3-5 inches | 100,000 | 145,825 | 145.8% |
| Kamloops trout | 3-5 inches | 39,000 | 37,257 | 95.5% |
| Kamloops trout | 5-8 inches | 181,500 | 142,859 | 78.7% |
| Kamloops trout | 5-8 inches | 8,000 | 0 | ^a 0.0% |
| Hayspur rainbow | 5-8 inches | 400,000 | 566,204 | ^b 141.6% |
| fall chinook | 5-8 inches | 10,000 | 17,267 | 172.7% |
| Kamloops trout | 8-12 inches | 373,350 | 456,047 | 122.1 % |
| Hayspur rainbow | broodstock | 3,000 | 4,993 | 166.4% |
| Kamloops trout | broodstock | 1,000 | 2,120 | 212.0% |
| Totals | | 1,266,350 | 1,555,537 | 122.8% |
| ^a Received as fingerlings and destroyed because disease protocol was not met. ^b Does not include fingerlings which were destroyed because of disease protocol. - 16,000 fingerlings weighing 320 pounds. | | | | |

Appendix 2. Fry production at Nampa Hatchery, 1994.

| Species/strain | Source and date | Number received | Yield number | Yield pounds | % survival egg to plant | Destination |
|--------------------|------------------|-----------------|--------------|--------------|-------------------------|--------------------|
| Lahontan cutthroat | Omak, 4/94 | 50,000 | 42,000 | 21 | 84.0% | Southwest Region |
| Kamloops trout | Troutlodge, 6/94 | 25,000 | 22,035 | 40 | 88.1% | Transfer to Mackay |
| Kamloops trout | Troutlodge, 8/94 | 61,000 | 57,915 | 33 | 94.9% | Upper Snake Region |
| Totals | | 136,000 | 121,950 | 94 | 89.7% | |

Appendix 3. Fingerling production at Nampa Hatchery, 1994.

| Species/ strain | Source and date | Number received | Yield number | Yield pounds | % survival egg to plant | Destination |
|--|--------------------------|--------------------|-----------------|-----------------|----------------------------|---|
| Kamloops trout | Troutlodge, 9/93 | 120,000 | 98,000 | 5,600 | 81.7% | Panhandle Region |
| brown trout | Saratoga, 11 /93 | 100,000 | 50,095 | 646 | 50.1% | Panhandle Region Southwest Region |
| brown trout | Manchester, 11 /93 | 15,000 | 10,920 | 78 | 72.8% | Southwest Region |
| fall chinook | Sandpoint, 11 /93 | 30,000 | 17,267 | 910 | 57.6% | Panhandle Region |
| Hayspur rainbow ^a | Hayspur, 11 /93-12/93 | 513,587 | 434,804 | 19,915 | 84.7% | Panhandle Region Southwest Region Southeast Region |
| Kamloops trout | Hayspur, 2/94-3/94 | 120,974 | 76,022 | 6,075 | 62.8% | Panhandle Region Clearwater Region Southwest Region |
| Hayspur rainbow | Hayspur 3/94 | 181,751 | 131,400 | 19,000 | 72.3% | Southwest Region Southeast Region |
| Lahontan cutthroat | Omak, 4/94 | 190,000 | 145,825 | 2,500 | 76.8% | Southwest Region Upper Snake Region |
| Kamloops trout | Troutlodge, 7/94 | 7,000 | 6,094 | 52 | 87.1% | Transfer to McCall |
| Totals | | 1,151,312 | 970,427 | 54,776 | 84.3% | |
| ^a Part of this lot (16,000 fingerlings weighing 320 pounds) were destroyed. | | | | | | |

Appendix 4. Catchable production at Nampa Hatchery, 1994.

| Species/ strain | Source and date | Number received | Yield Number | Yield Pounds | % survival egg to plant | Destination |
|--|--------------------------|--------------------|-----------------|-----------------|----------------------------|--------------------|
| Hayspur rainbow | Hayspur, 12/92 | ^a NA | 34,269 | 11,747 | NA | Southwest Region |
| Kamloops trout | Troutlodge, 6/93-9/93 | 460,000 | 358,928 | 110,544 | 78.0% | Southwest Region |
| Kamloops trout | Troutlodge, 6/93-9/93 | 76,000 | 62,850 | 18,777 | 82.7% | Transfer to McCall |
| Totals | | | 456,047 | 141,068 | | |
| ^a Production fish carried over from 1993. | | | | | | |

Appendix 5. Broodstock production at Nampa Hatchery, 1994.

| Species/ strain | Source and date | Number received | Yield number | Yield pounds | % survival egg to plant | Destination |
|--------------------|--------------------|--------------------|-----------------|-----------------|----------------------------|---------------------|
| Hayspur rainbow | Hayspur, BY 93 | 5,000 | 3,020 | 2,700 | NA | Transfer to Hayspur |
| | | | 1,973 | 1,973 | NA | Southwest Region |
| Kamloops trout | Hayspur, BY 92 | 2,150 | 1,010 | 3,535 | NA | Transfer to Hayspur |
| | | | 1,110 | 2,927 | NA | Southwest Region |
| Totals | | | 7,113 | 11,135 | | |

Appendix 6. Total cost of fish production at Nampa Hatchery.

| Year | Put-and-take | | Put-grow-and-take | | Pounds | Feed | | Feed conversion | Total cost | Cost/1,000 fish | Cost/pound | Cost/inch |
|------|--------------|---------|-------------------|--------|---------|---------|----------|-----------------|------------|-----------------|------------|-----------|
| | Number | Pounds | Number | Pounds | | Pounds | Costs | | | | | |
| 1993 | 475,356 | 150,559 | 773,395 | 32,762 | 183,321 | 276,606 | \$92,145 | 1.51 | \$265,283 | \$212.44 | \$1.45 | \$0.030 |
| 1994 | 308,023 | 146,978 | 793,065 | 55,014 | 201,992 | 220,544 | \$72,340 | 1.09 | \$258,010 | \$234.32 | \$1.28 | \$0.029 |

Appendix 7. Eggs received at Nampa Hatchery, January 1 to December 31, 1994.

| Species/ strain | Date received | Source | Number | Destination | Expected yield | Cost/1,000 fish |
|---|------------------|------------|-----------|---|-------------------|--------------------|
| Kamloops trout | 2/94 | Hayspur | 50,974 | Southwest Region | 33,000 | N/C |
| Hayspur rainbow | 3/94 | Hayspur | 181,751 | Southeast Region | 130,000 | N/C |
| Kamloops trout | 3/94 | Hayspur | 70,000 | Clearwater Region | 60,000 | ^a N/C |
| Lahontan cutthroat | 4/94 | Omak | 240,000 | Southwest Region Upper Snake Region | 153,000 | N/C |
| Kamloops trout | 6/94 | Troutlodge | 204,160 | Southwest Region | 152,000 | 15.25 |
| Kamloops trout | 7/94 | Troutlodge | 192,020 | Southwest Region | 130,000 | 15.25 |
| Kamloops trout | 8/94 | Troutlodge | 278,750 | Southwest Region | 120,000 | 15.25 |
| Hayspur rainbow | 12/94 | Hayspur | 103,448 | Southwest Region Magic Valley Region | 75,000 | N/C |
| fall chinook | 12/94 | Sandpoint | 46,800 | Panhandle Region | 40,000 | N/C |
| brown trout | 12/94 | Saratoga | 120,846 | Panhandle Region Southwest Region | 60,000 | N/C |
| Totals | | | 1,488,749 | | 953,000 | |
| ^a Part of this lot was destroyed (25,000 sac fry) due to disease protocol. | | | | | | |

Appendix 8. Nampa Hatchery feed costs, 1994.

| Supplier/Source | Size/Type | # boxes/bags | Pounds | Price/lb | Feed charge |
|--------------------------------|----------------|--------------|------------|----------|-------------|
| Biodiet | | | | | |
| soft-moist | starter #1 | 5 boxes | 220.4625 | 0.9725 | \$214.40 |
| soft-moist | starter #2 | 5 boxes | 220.4625 | 0.9426 | \$207.81 |
| soft-moist | starter #3 | 5 boxes | 220.4625 | 0.9490 | \$209.22 |
| soft-moist | 1.0 mm | 17 boxes | 749.5725 | 0.7695 | \$576.80 |
| soft-moist | 1.3 mm | 16 boxes | 705.4800 | 0.7350 | \$518.53 |
| soft-moist | 1.5 mm | 43 boxes | 1,895.9775 | 0.7346 | \$1,392.79 |
| soft-moist | 2.5 mm | 45 boxes | 1,984.1625 | 0.6859 | \$1,360.94 |
| soft-moist | 3.0 mm | 8 boxes | 352.7400 | 0.6124 | \$216.02 |
| soft-moist | 1.0 mm 4% TM | 1 box | 44.0925 | 1.0384 | \$45.79 |
| soft-moist | 1.5 mm 4% TM | 1 box | 44.0925 | 0.9485 | \$41.82 |
| soft-moist | 2.5 mm 4% TM | 1 box | 44.0925 | 0.9939 | \$43.82 |
| Bioproducts feed charges | | | | | \$4,827.92 |
| Freight and other charges | | | | | \$596.79 |
| Total Bioproducts feed charges | | | | | \$5,424.71 |
| Rangen | | | | | |
| dry | #1 granule | 8 bags | 400 | 0.4440 | \$177.60 |
| dry | #2 granule | 67 bags | 3,350 | 0.4435 | \$1,485.62 |
| dry | #3 granule | 136 bags | 6,800 | 0.4435 | \$3,015.80 |
| dry | #4 granule | 360 bags | 18,000 | 0.2955 | \$5,319.00 |
| dry | coarse Cr. | 100 bags | 5,000 | 0.2949 | \$1,474.50 |
| 450 floating | 1/16-in pellet | 150 bags | 7,500 | 0.4358 | \$3,268.50 |
| extruded | 3/32-in pellet | 100 bags | 5,000 | 0.2389 | \$1,194.50 |
| 450 floating | 5/32-in pellet | 45 bags | 2,250 | 0.2813 | \$632.93 |
| extruded | 3/32-in pellet | bulk | 23,660 | 0.2329 | \$5,510.41 |

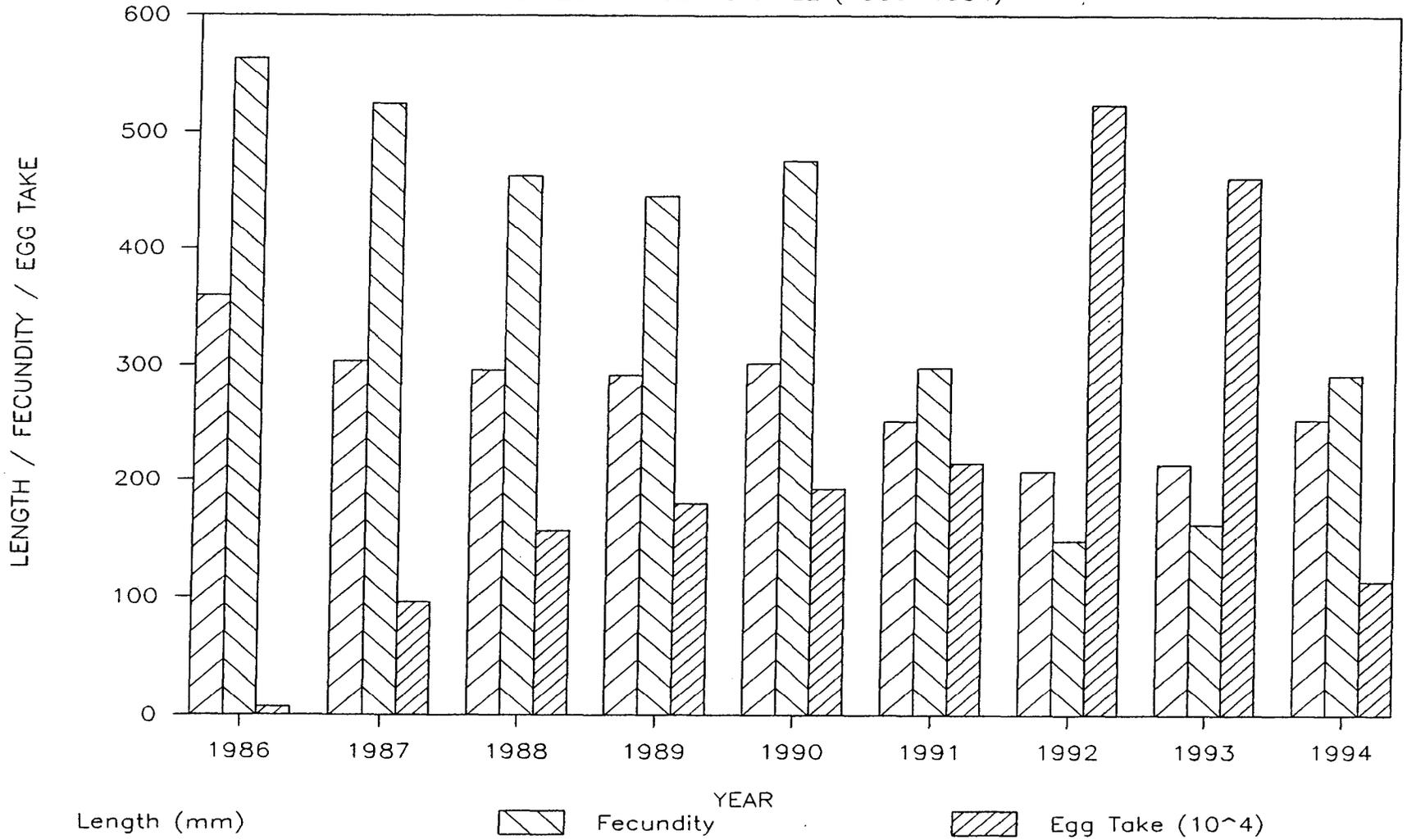
Appendix 8. Continued.

| Supplier/Source | Size/Type | # boxes/bags | Pounds | Price/lb | Feed charge |
|---------------------------|----------------|--------------|----------|--------------------|-------------|
| Rangen | | | | | |
| 450 floating | 1/8-in pellet | bulk | 16,710 | 0.2753 | \$4,600.26 |
| low phosphate | 1/8-in pellet | bulk | 27,980 | 0.2973 | \$8,318.45 |
| low phosphate | 5/32-in pellet | bulk | 73,260 | 0.2983 | \$21,853.46 |
| extruded | ¼-in pellet | 200 bags | 10,000 | 0.2996 | \$2,995.50 |
| soft-moist | starter | 2 boxes | 88 | 0.7300 | \$64.24 |
| soft-moist | 1/32-in pellet | 2 boxes | 88 | 0.6679 | \$58.78 |
| soft-moist | 3/64-in pellet | 2 boxes | 88 | 0.6368 | \$56.04 |
| soft-moist | #2 med. 2% TM | 2 boxes | 88 | 0.6058 | \$53.31 |
| dry medicated | #3 med. 2% TM | 10 bags | 1,250 | 0.5065 | \$253.25 |
| dry medicated | #4 med. 2% TM | 25 bags | 1,250 | 0.4866 | \$608.25 |
| extruded medicated | 3/32 med.4% | 116 bags | 5,800 | 0.4880 | \$2,830.40 |
| medicated | 1/8 med. 2% TM | 100 bags | 5,000 | 0.4127 | \$2,063.50 |
| Rangen feed charges | | | | | \$4,827.92 |
| Freight and other charges | | | | | \$596.79 |
| Total Rangen feed charges | | | | | \$5,424.71 |
| Total pounds | | | 220,544, | Total feed changes | \$72,340.12 |

Appendix 9. Kokanee egg take at Deadwood Reservoir, 1994.

| Lot number | Spawn date | Females spawned | Green eggs | Eyed eggs | % eye-up |
|--|------------|-----------------|------------|-----------|----------|
| 1 | 09/06/94 | 927 | 276,575 | 139,820 | 50.6% |
| 2 | 09/09/94 | 1,228 | 336,734 | 229,699 | 68.2% |
| 3 | 09/13/94 | 1,010 | 289,676 | 161,962 | 55.9% |
| 4 | 09/16/94 | 580 | 180,651 | 112,907 | 62.5% |
| ^a 5 | 09/20/94 | 150 | 53,116 | 34,937 | 65.8% |
| Totals | | 3,895 | 1,136,752 | 679,325 | 59.8% |
| ^a Entire egg take was shipped to Troutlodge (Hood River, Oregon) on 10/24/94. | | | | | |

LENGTH, FECUNDITY AND EGG TAKE OF DEADWOOD KOKANEE (1986-1994)



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Appendix 10. Length, fecundity, and egg take data from Deadwood Reservoir kokanee project.

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
SANDPOINT FISH HATCHERY
1994**

John R. Thorpe, Fish Hatchery Manager II

INTRODUCTION

The Sandpoint Hatchery is located in Bonner County on the south shoreline of the Pend Oreille River about two miles south of the town of Sandpoint. Although, the hatchery was closed in 1985, it was reopened in 1990 in response to public demand in the Panhandle Region. A limited water supply restricted production, resulting in high fish production costs. Public relations with local sportsmen's groups (Bonner County Sportsmen's Association, Trout Unlimited, and Lake Pend Oreille Idaho Club) is a major benefit of the station. Duties include managing a small-scale specialty station rearing rainbow trout Oncorhynchus mykiss, westslope cutthroat trout O. clarki lewisi, chinook salmon O. tshawytscha, kokanee salmon O. nerka kennerlyi, and Kootenai white sturgeon Acipenser transmontanus, managing a net pen rearing program, and operating or helping in north Idaho egg-taking programs.

The hatchery is license-funded, with \$4,600.00 allocated for operation in FY95. Special hatchery programs (sturgeon culture and cutthroat trout net pen culture) are funded by Bonneville Power Administration (BPA), Washington Water Power (WWP), Trout Unlimited (TU), and the Lake Pend Oreille Idaho Club (LPOIC). These funds are encumbered for specific use items such as water heaters, net pens, and fish feed; therefore, amounts vary annually.

The hatchery was staffed with a part-time hatchery manager (Assistant Fish Hatchery Manager) and a full-time (eight-month) Bio-Aide for the first half of 1994. Administrative supervision and additional manpower was provided from the Clark Fork Hatchery. Staffing adjustments were made while the hatchery manager pursued his Master's degree from the University of Idaho. The resident manager was transferred in July 1994, and his position was left vacant. The duties of operation of the Sandpoint Hatchery were taken on by the Clark Fork Hatchery Manager.

Water Supply

The hatchery water supply consists of 500 to 600 gallons per minute (gpm) at 7°C from Murphy Spring #3. Springs #1, #2, and #4 have not been developed for hatchery use; although, their discharge is included in the 4 cubic feet per second (cfs) water right. The hatchery flow fluctuates seasonally, with lowest flows in late summer and highest flow in early spring.

The Idaho Department of Fish and Game (IDFG) was deeded the springs in 1928. However, this deed did not include property ownership of the surrounding land. The easement agreement states that IDFG will provide a 2-inch domestic line to the land owners in exchange for a collection reservoir and pipe-line right-of-way from the springs to the hatchery.

The water right to spring #2 has been waived to the South Side Sewer District in the amount of 300 gpm. This water may be reclaimed for hatchery use if needed.

Rearing Facilities

The hatchery rearing facilities include 8 Heath incubators (8-tray), 18 cement vats (15 ft x 2.5 ft x 3 ft) inside the hatchery building, and 2 outdoor concrete raceways (100 ft x 5 ft x 2 ft). Two vats have been modified with heaters and recirculation pumps for warm water rearing. The carrying capacity of the hatchery ranges from 880 pounds (2.5 million) of 1-inch fish to 12,800 pounds (25.5 thousand) of 10-inch fish.

Off-site hatchery rearing facilities include 8 net pen frames and 11 net pens (20 ft x 20 ft x 20 ft) with assorted mesh sizes ranging from 1/4-inch to 1 1/4-inch. A carrying capacity for net pens has not been established, but not exceeding 1,000 pounds per pen has shown good results.

The hatchery buildings consist of one nursery/shop/office complex, one storage shed, garage/crew quarters, and a residence. A regional shed provides covered storage.

Hatchery Improvements

A visitor information kiosk was constructed during 1994. The covered display will consist of 14 panels (192 ft²) of graphic and textual display denoting local history, fishery management programs, and habitat information. Funding was provided by donations from Bonner County Sportsmen's Association (BCSA), LPOIC, TU, and WWP. The graphics are due from the contractor in early 1995.

The main irrigation pump which provides water to the 3.6-acre site was remanufactured this year and wired to meet state electrical code.

The hatchery acquired a computer, printer, and software this year, bringing equipment into line with other state hatcheries. With a facsimile machine purchased in 1994, communications time has been greatly reduced. A 3/4-ton 4x4 pick-up truck was also purchased in 1994.

Hatchery improvements needed include:

- A new water collection system at spring #3 to collect the water now by passing the spring box.

- Lighting for the hatchery building (rearing area) so that fish can be worked after dark.
- A drainage system to carry ground water away from the walls of the residence. The basement stays damp most of the years, and has flowing water across the floor during spring thaw.

FISH PRODUCTION

The Sandpoint Hatchery produced 7,620 pounds of fish (Appendices 1 and 2) from 7,219 pounds of feed (0.95 conversion) (Appendix 3). On-station production was 4,044 pounds of fish from 4,219 pounds of feed (1.04 conversion). Net pen production was 3,576 pounds of fish from 3,000 pounds of feed (0.84 conversion). Production costs were estimated at \$7.04 per pound gain and \$62.98 per thousand fish (Appendix 2).

FISH SPAWNING

Chinook Salmon

The chinook trap was installed in Wolf Lodge Creek by Clark Fork Hatchery and Regional personnel in early September 1994. The trap was left unattended for lack of funding. Criteria for broodstock selection included:

1. Size - females over 18 pounds
2. Timing - fish entering the trap before October 1
3. Pairs - a minimum of 25

The Wolf Lodge weir trapped 97 fish by September 29 when spawning was stopped. The trap remained in place, and fish numbers were monitored by Regional personnel until the run ceased. Adult female salmon were selected using the preestablished criteria to meet the minimum requirement of 25 pairs. All selection criteria were met in 1994. Females were spawned individually with milt from 2-3 males added. Tissue and ovarian fluid samples were taken from all fish spawned and shipped to the Eagle Fish Health Laboratory for disease screening. Eggs from each female were kept separate throughout the spawning and incubation process. All fish were disease free. From 35 females, 192,034 green eggs were spawned, resulting in 117,249 eyed eggs (61.1%) (Appendix 4).

Nampa Hatchery would rear these fish to release size. To accommodate space restriction at the Nampa Hatchery, the eggs were not shipped until December 5. At

that time, 46,817 eyed eggs were shipped. The majority of the first three lots had commenced hatching by December 5 and were retained at the Sandpoint Hatchery. These fish were to be ponded and held in reserve to resupply the Nampa Hatchery if necessary.

FISH FEED

Normal production feed is purchased from Bioproducts, Inc. in Warrenton, Oregon. Fish are started on BioDiet starters and switched to BioDry 4000 for growout. Ration quantity is adjusted weekly and is calculated using Haskell's formula. To accommodate the reduced personnel at the Sandpoint Hatchery, automatic belt feeders are used. Feed purchased and its cost during 1994 is found in Appendix 3. All of the feed fed to the net pen-reared cutthroat was purchased with donated funds.

PUBLIC RELATIONS

About 3,000 people toured the Sandpoint Hatchery in 1994. Effort was made to talk with every tourist visiting the hatchery. Tourist groups varied from recreational to professional, with most leaving the hatchery with a good opinion of IDFG. Excellent relations were maintained with BCSA, TU and LPOIC. All personnel working the Sandpoint Hatchery, both permanent and temporary, are proactive in communication with local sportsmen's clubs. As part of this interface, the visitor information display is being developed in cooperation with local clubs, IDFG staff, and Idaho Department of Parks and Recreation personnel. Hatchery personnel manned a booth with a fish display at the annual TU banquet and Bonner County Fair. Hatchery personnel also gave multiple presentations to the LPOIC organization.

The Sagle Elementary School is still involved in hatching kokanee eggs in a small aquarium and releasing fry into Garfield Bay Creek, Lake Pend Oreille. The Sandpoint Hatchery personnel deliver the eggs and give a short presentation regarding kokanee life history in Lake Pend Oreille. The program is designed for natural resource education.

The Idaho Wildlife Foundation is pursuing the use of the Sandpoint Hatchery site as a North Idaho Conservation Center. A feasibility study has been initiated to determine direction and potential. As with all other public relations projects at the Sandpoint Hatchery, funding will be entirely donated.

SPECIAL PROJECTS

Kootenai White Sturgeon

Two age classes, 1992 and 1993, of Kootenai River white sturgeon are being reared at the Sandpoint Hatchery. Sturgeon culture at the Sandpoint Hatchery continued throughout 1994 on a temporary and "as needed" basis. The entire program at Sandpoint was in support of the Kootenai Tribal culture efforts. The Tribe paid for the additional electric power costs related to running water heaters and recirculation pumps. The Sandpoint Hatchery received and transferred fish at the discretion and request of the Tribal biologists. All of these transfers were without documentation on the part of Kootenai Tribal personnel.

On January 1, 1994, there were 21 (31.8 lbs) brood year 1992 and 15 (2.5 lbs) brood year 1993 Kootenai River white sturgeon on-station. Mortalities in the brood year 1993 fish resulted in a final number of 3 (0.2 lbs) fish remaining. All of the Kootenai Hatchery brood year 1992 fish (351) were transferred to Sandpoint by April 1994. Of those, 100 were taken back for tagging and release in the Kootenai River. At the end of December 1994, 166 (88.2 lbs) were transferred to hatchery vats from outside raceways. Thirteen observed mortalities were removed from the outside raceways from April to December 1994. It is surmised that the other 172 fish lost by inventory were taken by predators in that time period. There were 151 (151.5 lbs) brood year 1992 Kootenai River white sturgeon on hand December 31, 1994. Total production was 117.4 lbs for 1994.

Project funding of \$8,000.00 has been identified by the Kootenai Tribe and merits special project status for sturgeon culture at the Sandpoint Hatchery. Two vats modified with heaters and pumps (recirculating) have been allocated to sturgeon culture. Fish production in these two vats is limited by fish waste products (nitrogenous) which degrades the water quality. Water quality limits production when fish weight exceeds 50 pounds per vat; therefore, vats are limited to a specific number of fish for the allowable 50 pounds (22.7 kilos).

Piper's (1970) density and flow indices have been applied to sturgeon reared at Sandpoint using the same guidelines as those applied to trout. It is recommended that a density index not exceed 0.5 to allow all fish a "resting" position on the raceway bottom.

Appendix 1. Fish production at the Sandpoint Hatchery, January 1, 1994 to December 31, 1994.

| Species/Strain | Source | Beginning number | Beginning pounds | Ending number | Ending pounds | Number stocked/ transferred | Pounds stocked/ transferred | Destination |
|------------------------------|------------------------|------------------|------------------|---------------|---------------|--------------------------------|--------------------------------|---------------------------|
| westslope cutthroat BY 91 | Clark Fork Hatchery | 16,000 | 2,909 | 0 | 0 | 15,033 | 4,020 | Lake Pend Oreille nets |
| westslope cutthroat BY 92 | Montana | 7,985 | 210.1 | 8,631 | 1,087.0 | 0 | 0 | broodstock |
| westslope cutthroat BY 92 | Clark Fork Hatchery | 50,000 | 2,550 | 0 | 0 | 46,000 | 5,015 | Lake Pend Oreille nets |
| westslope cutthroat BY 93 | Montana | 63,715 | 127.4 | 4,168 | 84.6 | 54,000 | 223 | broodstock |
| rainbow x cutthroat BY 93 | Henrys Lake | 2,950 | 11.8 | 0 | 0 | 2,800 | 140 | Jewel Lake |
| October kokanee BY 93 | Oregon | 0 | 0 | 0 | 0 | 72,000 | 600 | Lucky Peak Reservoir |
| late kokanee BY 93 | Lake Pend Oreille | 0 | 0 | 0 | 0 | 430,000 | 460 | Lake Pend Oreille |
| Hayspur rainbow | Hayspur | 0 | 0 | 0 | 0 | 220,006 | 1,799 | southern Idaho |
| Total | | 140,650 | 5,808.3 | 12,799 | 1,171.6 | 839,839 | 12,257 | |

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Appendix 2. Cost of fish produced at the Sandpoint Fish Hatchery, January 1 to December 31, 1994.

| Species/Strain | Numbers produced | Pounds produced | Cost to produce | Cost/1,000 | Cost/lb |
|--|------------------|-----------------|-----------------|------------|---------|
| westslope cutthroat >6 inches, BY 91 | 15,033 | 1,111 | \$900 | \$59.87 | \$0.81 |
| westslope cutthroat >6 inches, BY 92 | 54,631 | 3,342 | \$9,000 | \$164.74 | \$2.69 |
| westslope cutthroat 2-5 inches, BY 93 | 58,168 | 180 | \$5,100 | \$87.68 | \$28.33 |
| rainbow x cutthroat BY 93 | 2,800 | 128 | \$1,200 | \$428.57 | \$9.36 |
| late kokanee BY 93 | 502,000 | 1,060 | \$14,000 | \$27.88 | \$13.21 |
| Hayspur rainbow BY 94 | 220,006 | 1,799 | \$23,500 | \$106.82 | \$13.06 |
| Totals | 852,638 | 7,620 | \$53,700 | \$62.98 | \$7.05 |

Appendix 3. Fish feed used in 1994 at the Sandpoint Fish Hatchery.

| Size | Source | Pounds | Cost/lb | Total cost |
|--|-------------|--------|---------|------------|
| BioDiet starter #1 | Bioproducts | 68 | \$.97 | \$65.96 |
| BioDiet starter #2 | Bioproducts | 166 | \$.97 | \$161.02 |
| BioDiet starter #3 | Bioproducts | 363 | \$.98 | \$355.74 |
| BioDiet brood 5.0 mm | Bioproducts | 289 | \$.63 | \$182.07 |
| BioDry 4000 1.0 mm | Bioproducts | 1,615 | \$.60 | \$969.00 |
| BioDry 4000 1.3 mm | Bioproducts | 98 | \$.62 | \$60.76 |
| BioDry 4000 1.5 mm | Bioproducts | 167 | \$.54 | \$90.18 |
| BioDry 4000 2.5 mm | Bioproducts | 230 | \$.51 | \$117.30 |
| BioDry 4000 3.0 mm | Bioproducts | 1,181 | \$.51 | \$602.31 |
| BioDry 4000 4.0 mm | Bioproducts | 42 | \$.54 | \$22.68 |
| Totals | | 4,219 | | \$2,627.02 |
| BioDry 4000 3.0 mm donated by LPOIC | Bioproducts | 3,000 | \$.51 | \$1,530.00 |
| Grand Totals | | 7,219 | | \$4,157.02 |

Appendix 4. Spawning summary, Wolf Lodge Creek fall chinook salmon, September 15-26, 1994.

| Date | Females spawned | Number of eggs collected | Average fecuncity | Percent eye-up | Eyed eggs |
|--------|-----------------|--------------------------|-------------------|----------------|-----------|
| Sep 15 | 2 | 7,375 | 3,688 | 70.5 | 5,198 |
| Sep 21 | 7 | 36,204 | 5,172 | 68.6 | 24,838 |
| Sep 26 | 11 | 53,630 | 4,875 | 66.0 | 35,396 |
| Sep 29 | 15 | 94,825 | 6,322 | 54.6 | 51,817 |
| Totals | 35 | 192,034 | 5,487 | 61.1 | 117,249 |

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
SAWTOOTH FISH HATCHERY
1994**

Bill Stutz, Fish Culturist

INTRODUCTION

Sawtooth Hatchery is a U.S. Fish and Wildlife Service Lower Snake River Compensation Plan hatchery and has been in operation since 1985. Although the primary goal of the hatchery is to trap, spawn, rear, and release spring chinook salmon Oncorhynchus tshawytscha and trap and ship eyed steelhead eggs, we initiated a program in 1990 to stock catchable rainbow trout O. mykiss. During 1994, we planted a total of 69,350 rainbow trout throughout the Salmon Region. Sawtooth personnel also assisted Salmon regional personnel with fish sampling in Yellowbelly Lake and helped Fisheries Bureau personnel collect catchable rainbow trout fish stomachs and examine contents for diet analysis as required by our National Marine Fisheries Service (NMFS) Permit No. 908.

FISH STOCKING

In the past, Hayspur Hatchery has either planted the Stanley Basin and surrounding area or supplied fish for this purpose. Again in 1994, Hayspur Hatchery fulfilled our request for catchable rainbow trout. We started stocking on May 20 and continued through November 18, 1994.

The majority of the fish (37,000) were planted in the Salmon River between Hell Roaring Creek and Thompson Creek, while the remaining 32,350 fish were planted in tributaries to the Salmon River and several smaller, accessible lakes in the Salmon Region (Appendix 1). The stocked fish averaged 9.5 inches in length. Salmon regional personnel stocked an additional 41 9 largemouth bass Micropterus salmoides, wild rainbow trout, and bluegill Lepomis macrochirus (Appendix 2). These fish are in our database so I included them in this report.

We followed a planting schedule devised earlier in the year that was similar to schedules in the past. For planning purposes, the river was divided into five sections (Appendix 3). Stocking sites were based on accessibility to the public, ease of planting, and habitat requirements of the fish. Some fish plants were eliminated during the latter part of the summer due to low warm water and possible conflicts with spawning adult salmon.

Normally, Sawtooth Hatchery fish plants are limited to the Sawtooth Valley, Stanley Basin, and some outlying lakes. However in 1994, Sawtooth handled most of Mackay Hatchery's rainbow trout requests for the Salmon Region. As a result, Sawtooth's crew logged 7,800 miles and 351 hours in 1994 on our catchable program; a substantial increase from 1993 when we traveled 2,200 miles and spent 202 hours on our resident program.

Sawtooth Hatchery made an extra effort in 1994 to inform anglers of our stocking program. We placed signs at the most frequent stocking sites and hand-delivered or mailed planting memos on a weekly basis to interested local merchants.

PLANS FOR 1995

For the 1995 fish season we would like to make a detailed area map indicating stocking sites. This map could be distributed to local merchants for display, and when used in conjunction with the weekly planting, memos would make it easier for anglers to locate the most recently stocked fishing holes.

If feasible, Sawtooth Hatchery would like to procure 2,000 small rainbow trout from Hayspur Hatchery this fall and raise them in one of our small outside raceways on an experimental basis. We could closely monitor growth of these fish to meet the size limits of our permit. This would also ease some of the crowded conditions Hayspur Hatchery experiences in the spring before the stocking season begins.

Finally, the Sawtooth crew would like to examine the possibility of hosting a kid's Fishing Day/Fishing Clinic at our wildlife/display pond at the hatchery in May or June of 1995. Currently no opportunity exists for local kids to get involved with such a program to learn the basics of fishing. We could be passing up one of our best opportunities to generate local interest in our fishing resources. The nearest such program is 120 miles away in Salmon, which was a huge success in 1994.

ACKNOWLEDGEMENTS

We would like to thank Bob Esselman and the crew at Hayspur Hatchery for their cooperation in getting fish and feed to us when we needed it, and also for their willingness to communicate back and forth. I would also like to thank the Sawtooth crew, with their help the resident program ran smoothly.

Appendix 1. Planting sites and numbers of catchable rainbow trout stocked in the Salmon Region during May through November, 1994.

| Site | Number |
|-------------------------|--------|
| Salmon River | 37,500 |
| North Fork Salmon River | 900 |
| Valley Creek | 4,000 |
| Stanley Lake Creek | 500 |
| Morgan Creek | 200 |
| Panther Creek | 1,000 |
| Hyde Pond | 875 |
| Anderson Pond | 700 |
| Broken Arrow Pond | 600 |
| Perkins Lake | 2,500 |
| Pettit Lake | 4,000 |
| Cape Horn Lake #2 | 500 |
| Josephus Lake (lower) | 1,000 |
| Kids Creek Pond | 1,625 |
| Mosquito Flat Reservoir | 2,000 |
| Hayden Creek Pond | 1,200 |
| Yankee Fork Ponds | 3,000 |
| Yellowjacket Lake | 900 |
| Grouse Lake | 200 |
| Eagle Rock Pond | 150 |
| Iron Lake | 2,000 |
| Wallace Lake | 2,000 |
| Little Bayhorse Lake | 2,000 |
| TOTAL | 69,350 |

Appendix 2. Date, location, species, and number of fish the Salmon Region personnel planted in the region.

| Date | Location | Species | Numbers |
|----------|-------------|--------------------|---------|
| 03/28/94 | Hayden Pond | largemouth bass | 36 |
| 03/28/94 | Hayden Pond | bluegill | 297 |
| 06/15/94 | Hayden Pond | largemouth bass | 11 |
| 10/08/94 | Quake Lake | wild rainbow trout | 75 |

Appendix 3. Boundaries for Salmon River sections.

| | |
|-----------|---|
| Section 8 | Hellroaring Lake Creek bridge downstream to Redfish Lake Creek. |
| Section 7 | Redfish Lake Creek downstream to Valley Creek. |
| Section 6 | Valley Creek downstream to Yankee Fork River. |
| Section 5 | Yankee Fork River downstream to Yankee Fork Ranger Station. |
| Section 1 | Salmon River at Salmon. |

IDAHO DEPARTMENT OF FISH AND GAME

RESIDENT HATCHERIES

FISH HEALTH REPORT

1994

Douglas R. Burton
Fishery Pathologist

RESIDENT HATCHERIES FISH HEALTH REPORT 1994

INTRODUCTION

As the Resident Hatchery Pathologist, I spent over half of 1994 at my office at the Eagle Fish Health Laboratory. While there, I assisted with some laboratory work, performed quality control on the work of the technologists, communicated frequently with hatchery personnel regarding the results from samples taken on their facilities, wrote numerous reports, and generated a considerable pile of other paperwork. Additionally, I devoted several weeks to the development of permit applications and study protocols for the use of Chloramine-T, oxytetracycline, and formalin at resident hatcheries through the Western Regional INAD (Investigational New Animal Drug) Program. I spent slightly over a third of my work time on the road, observing and sampling fish, and discussing plans and problems with hatchery personnel. The remainder of my time (about 10%) was spent in additional training, at Idaho Department of Fish and Game (IDFG) meetings or functions, and in other administrative duties.

Carla Hogge, Fishery Technologist, and I represented IDFG at a two-week Salmonid Disease Workshop at the University of Oregon's Hatfield Marine Science Center in Newport, Oregon. The workshop was an intense course designed for fish health professionals, veterinarians, and advanced graduate students. Both of us benefited from the opportunity to refresh our knowledge of laboratory and diagnostic techniques used in the fish health profession and to update ourselves on the most current information available in the field. We also learned about areas of fish culture and health, such as salt water net-pen culture, which we might never experience without traveling outside of Idaho.

I examined a total of 121 cases at IDFG resident hatcheries during 1994 (81 routine inspections and 40 diagnostic cases). A summary of my work at each individual hatchery, as well as the results of all inspection and diagnostic sampling, are as follows.

AMERICAN FALLS

American Falls Hatchery's perennial problem with coldwater disease ([CWD] Flexibacteriosis), caused by Flexibacter psychrophilus, was particularly bad in 1994. Oxytetracycline (OTC) is no longer legal for use against CWD without an INAD permit, which was not yet available. A concomitant Pseudomonas infection was discovered,

which is legal to treat with OTC; therefore, the drug was applied. Unfortunately, response to the treatment was minimal. An INAD which will allow a higher dosage of the drug will be available for 1995.

There is some uncertainty about the origin of the CWD bacteria at American Falls. One possibility is that the pathogen originates at Hayspur Hatchery, the source for all of American Falls Hatchery's rainbow trout eggs. Attempts to inhibit vertical transmission of the bacteria are continuing at Hayspur Hatchery with the use of OTC injections to the female broodstock. Other proposed control methods, which may be tested in the future, include water-hardening eggs in OTC and/or osmotic infusion of OTC into eyed eggs. The other possibility is that there is an endemic strain of E. psychrophilus at American Falls Hatchery. This is supported by the high level of drug resistance evident at American Falls which is not found at other hatcheries which receive Hayspur eggs. If this is true, it may become necessary to discontinue all use of OTC at American Falls Hatchery. Options at that time would be to manage around the disease with lowered densities and stresses in the rainbow, or to seek less susceptible strains or species to rear at the hatchery.

I visited the hatchery three times in 1994 (Appendix A). Small fish (lot 94R91) were sampled from the hatchery vats in February, and no pathogens were detected. This is consistent with the history of the hatchery, where no disease problems are generally seen until after the fish are moved to the outside raceways. Lot 94R92 was inspected in June, when the lot had been in the outside raceways for approximately one month. Both F. psychrophilus and Pseudomonas were detected. Lot 94R91 was inspected again in September. No pathogens were detected by standard bacteriology, but 3 of 12 five-fish pools were found positive for Renibacterium salmoninarum (Bacterial Kidney Disease [BKD]) by Enzyme-linked Immunosorbant Assay (ELISA) (2 lows, 1 moderate). This is not sufficient to effect American Falls Hatchery's "A" classification, as ELISA is not yet recognized as a technique for certification. This is another pathogen which may be vertically transmitted at Hayspur Hatchery. No clinical signs of BKD were observed.

Recommendations for American Falls Hatchery in 1995:

1. Reduce stresses of moving fish from hatchery building to the outside raceways. Consider increasing light inside the building, moving the fish at dusk or at night to avoid the sudden change from darkness to bright light, darken the outside raceway walls with paint (or let them sit with water for a couple of weeks before moving fish out), or look into some type of wind-proof shade structure.

ASHTON HATCHERY

Ashton Hatchery was visited three times in 1994 by myself or other pathologists from the Eagle Fish Health Laboratory (Appendix B). The first visit was in February in response to a call that brook trout fry were dying. Early-feeding fry were beginning to lose orientation and float to the surface of the vat. When disturbed, they would re-orient and swim away, but they would float back to the surface as soon as they relaxed. No known pathogens were isolated from the fish. Histologic examination determined that there was gas in the swim bladders and abdominal cavities of the fish. No blockage of the gas bladder duct was observed. Unidentified spore-like clusters were observed in the gut of one fish. Pathologists were unable to determine the etiology of the episode, which either ran its course or the fish outgrew their susceptibility to the problem. The brook trout were inspected in July, when varying levels of Aeromonas hydrophila and Pseudomonas species were found, and again in September, when no pathogens were detected. Other fish inspected over the course of the year included the Hayspur rainbow trout and Atlantic salmon lots in February, and the Colorado rainbow trout lots in September. (One Atlantic salmon found swimming with the Colorado fish was also sampled). The only pathogen detected from any of these fish was Renibacterium salmoninarum (RS), the causative agent of BKD (no clinical disease was observed). All Atlantic salmon were ELISA positive at low levels (4 of 4 pools in February and the 1 fish in September). The brood year 1992 Colorado rainbow trout were also found RS positive by ELISA (3/12 pools low).

The only other significant health problems at Ashton Hatchery are the recurring infestations of Gyrodactylus which primarily effect the golden trout and the rainbow trout. The parasite has been controlled with formalin treatments, following FDA approved protocol. Concern continues to be the uncertain long-term effect of repeatedly exposing fish to a harsh chemical like formalin. There is undoubtedly a reservoir for the trematodes in the spring/marsh which needs further investigation and, if possible, elimination.

Ashton Hatchery is currently classified as a Class B Isolation facility. This is desirable in that it allows Ashton to ship eggs or fish to other Class B hatcheries. This classification may be put in jeopardy if eggs received at Ashton should ever prove to carry certifiable pathogens. The fact that more diseases have not turned up at Ashton is more likely due to the management efforts of the hatchery personnel than to an attempt to exclude pathogens from the facility.

Three recommendations to maintain this classification, as well as the quality of fish health, at Ashton are:

1. Be stringent in requiring disease certification from outside egg sources or consider reducing the importation of multiple stocks into the facility.

2. Use the most rigorous disinfection protocols practical on the hatchery and at Henrys Lake.
3. Intensify our efforts to identify and possibly cull contaminated eggs from Henrys Lake before transferring them to Ashton.

CABINET GORGE HATCHERY

From a fish health perspective, 1994 was a much better year at Cabinet Gorge Hatchery than was 1993. There were minor problems with the pumps, but none that resulted in disastrous dewatering of the fish. As a result, general health, as well as survival to stocking, was greatly improved. I visited the hatchery on two occasions for routine inspection of the fish (Appendix C). The small kokanee (both Deadwood and Pend Oreille stocks) were found negative for pathogens in March. The Hayspur rainbow trout were found to have a light load of Pseudomonas bacteria, which was probably an opportunist attacking fish being reared in water temperatures below their optimum range. Losses in the rainbow trout were somewhat elevated, but not at a level of great concern. The spawning kokanee at both Sullivan Springs and the hatchery ladder were inspected in December. Pools of fish from both sites were found to be positive for Renibacterium salmoninarum by ELISA at low levels. Spawning fish were also found to carry varying amounts of bacteria (Flexibacter and Pseudomonas species). Neither of these bacteria have been problems in kokanee fry at Cabinet Gorge Hatchery, but there is no way to assess impact after release into the lake.

An important fish health management change made at Cabinet Gorge this year was the phase-out of the captive broodstock program. The captive fish were diagnosed with clinical BKD in 1993, and the disease signs were continually observed through May and June 1994 when the fish were stocked out or destroyed. The presence of clinical BKD dropped Cabinet Gorge Hatchery's disease classification from an "A" quarantine facility to a "C" rating. This means that Cabinet Gorge can not ship eggs or fish to another A or B hatchery without reducing the classification of the receiving facility. Removal of the affected fish and three years of negative sampling results of fish on the hatchery will be required to elevate Cabinet Gorge's rating back to an "A" classification.

Fish were periodically treated with salt (sodium chloride) to alleviate gill disease and reduce osmotic stress. No other chemical or drug treatments were applied at Cabinet Gorge Hatchery in 1994.

Recommendations for 1995:

1. Reduce loading in individual raceways if possible, and closely monitor densities to avoid bacterial or environmental gill disease.

CLARK FORK HATCHERY

Infectious pancreatic necrosis (IPN) and BKD continue to be the major fish disease problems at Clark Fork Hatchery. Significant losses to IPN occurred in the brood year 1994 cutthroat trout fry of both Clark Fork and Washoe Park (Montana) lots. The IPN virus was confirmed by the Eagle Fish Health Lab from samples taken from brood year 1992 Clark Fork cutthroat trout in March, from brood year 1990 Washoe Park cutthroat trout in May, and from brood year 1994 Hayspur rainbow trout, brood year 1994 Washoe Park cutthroat trout, and brood year 1993 Henrys Lake brook trout in August (Appendix D). The outbreak of IPN, which usually occurs in brook trout fry about April, was a minor event in 1994.

Renibacterium salmoninarum was detected from the Washoe Park brood year 1989 and brood year 1990 cutthroat trout broodstock and from the brood year 1994 Washoe Park fingerling by both ELISA and Fluorescent Antibody Test (FAT). The brood year 1992 Clark Fork cutthroat trout broodstock and the brood year 1992 Hayspur rainbow trout were positive by ELISA only. In addition, clinical BKD was observed among the cutthroat broodstock and fingerling.

The only other primary pathogen detected at Clark Fork this year was Flexibacter psychrophilus, the causative agent of CWD. This bacteria was isolated from the brood year 1994 Hayspur rainbow trout, but no clinical signs were seen. This bacteria is common in this stock of rainbow

The open water source (Spring Creek) provides a constant reservoir for pathogens. The brook trout in the areas above the hatchery have repeatedly tested positive for IPN virus (Eagle Fish Health Lab database; Accessions 90-187, 90-252, and 94-446), but had not been positive for RS by FAT (Accessions 89-097, 90-123, 90-187, 90-252, 94-446). However, 1994 was the first year the fish had ever been tested using the more sensitive ELISA technique. All pools (12 of 12) were positive by ELISA (3 lows, 7 moderates, 2 highs). This strongly indicates the probability of horizontal transmission occurring from these fish to the fish in the hatchery, making efforts to clean up BKD at Clark Fork more difficult. An INAD permit for the use of erythromycin has been available for several years, but has not been used due to the extra cost of the feed. The proposed tests of enrofloxacin have been cancelled because the drug is not available.

Cleaning up the IPN problem will also be difficult, considering the existing water source and broodstock population. Isolation incubation and the culling of eggs from tested positive females could eventually eliminate the virus from a broodstock population, but only if a clean water source is available. Future broodstock must remain in clean water, but production fish could go out on creek water after they grow past the most susceptible life state. (Infection could still occur, but the risk of clinical

disease and subsequent mortality is much less.) The best option for a clean water source is to transfer the broodstock program to Sandpoint Hatchery and bring fingerling back to Clark Fork for production.

Clark Fork personnel were responsible for the fall chinook spawning at Wolf Lodge Creek (Coeur d'Alene Lake), and also collected the disease samples from the brood fish. Therefore, the test results were reported out to Clark Fork Hatchery. The fish were all found to be negative for both viruses and RS.

Recommendations for better disease control at Clark Fork Hatchery include:

1. Develop an existing well to provide pathogen-free water for incubation and early rearing, or make use of facilities at Sandpoint Hatchery for incubation and early rearing.
2. Isolate cutthroat trout eggs for future broodstock, and cull eggs from IPN positive females. Incubate and rear on pathogen-free water for as long as possible.
3. Feed erythromycin to both brood and production cutthroat to minimize the impact of clinical BKD.
4. Re-evaluate production programs with the idea of shifting to more disease-resistant, cold water-tolerant species.

CLEARWATER HATCHERY

The brood year 1992 Black Canyon rainbow trout were sampled in January, prior to the spring stocking in Clearwater Region waters (Appendix E). They were found negative for primary pathogens, although a light to moderate number of Pseudomonas paucimobilis bacteria were isolated from 5 fish. There is a possibility that these bacteria were contaminants, and since there were never any excessive mortalities among the fish, no action was taken. A nonsignificant amount of a Pseudomonas species was also isolated from these fish in September 1993 (Accession 93-460).

The future of the resident program at Clearwater Hatchery is contingent on space and water available after the needs of the anadromous programs are met. Therefore, long-term suggestions are difficult to make. The one important recommendation to make is to maintain the strictest possible isolation between the rainbow trout and any anadromous fishes on the hatchery.

GRACE HATCHERY

Grace Hatchery was visited on three occasions in 1994; twice for routine inspection and once for a diagnostic call (Appendix F). The only clinical pathology found on the hatchery was CWD. No legal treatment for this disease was available at the time, but an INAD permit has been approved for the use of oxytetracycline in 1995. A carrier state of Renibacterium salmoninarum was detected by ELISA in the catchable-size Hayspur rainbow trout.

Grace Hatchery is currently a "B" class (isolation) facility due to the open spring. The Department needs to continue efforts to either purchase the spring property or acquire a long-term lease with a provision allowing enclosure of the spring. Grace Hatchery would then have the potential to be upgraded to class "A" quarantine status. The primary benefit from this change, aside from better fish health and survivability, would be greater leeway in transferring fish from Grace Hatchery.

Recommendations for the 1995 season at Grace include:

1. Remove fish from the springs, pipes, and head boxes.
2. Renew negotiations with the landowner to purchase, lease, or renovate Upper Whiskey Springs.

HAGERMAN HATCHERY

Pathologists from the Eagle Fish Health Laboratory visited Hagerman Hatchery on 14 occasions. Fish sampled included several lots of rainbow and Kamloops trout, Kamloops x steelhead crosses from Trout Lodge, rainbow x cutthroat hybrids, and cutthroat trout (Appendix G). The laboratory detected infectious hematopoietic necrosis (IHN) virus from several lots of Hayspur rainbow trout and from the Trout Lodge crosses. Clinical losses were frequently seen in the smaller sized fish. There is very likely an interaction between IHN and bacterial CWD at Hagerman, where the bacterial disease may be a precursor to the viral disease and possibly mediates the severity of the viral episode.

Coldwater disease was diagnosed in several lots of fish. Oxytetracycline added to the feed formulations has historically been used to treat CWD at Hagerman. However, the drug is not labelled for use against this pathogen, and an INAD permit was not in place in 1994. Therefore, use of the drug to treat this specific disease was discontinued.

Motile aeromonads (A. hydrophila, A. sobria, etc.) are often isolated from fish at Hagerman. These are common bacteria, and are most often secondary rather than primary pathogens. The OTC label includes aeromonads, therefore the drug was used whenever these bacteria were isolated from sick fish.

Another bacterial pathogen detected at Hagerman in 1994 was Flexibacter columnaris. Oxytetracycline may also be effective in treating systemic infections of columnaris disease, but was not FDA approved in 1994. There will be INADs for the use of both OTC and Chloramine-T against this pathogen in 1995.

Parasites did not cause the significant problems that had been seen in previous years at Hagerman Hatchery. The Riley Creek headrace was dried and disinfected over the previous winter, reducing the number of snails, which are the intermediate hosts of Sanguinicola klamathensis. This practice should become a part of annual hatchery operations, as no other practical method to eliminate Sanguinicola from Riley Creek has been found. If creek water must be used to meet hatchery production goals, the hatchery manager should attempt to shorten the exposure time as much as possible during the months of warmest water. There is no evidence to date that the parasite has been spread with Hagerman fish to other waters in the state, perhaps because the intermediate host is not widespread (or because no one has looked).

Finally, Ichthyobodo (also known as Costia) was found on a group of Henrys Lake cutthroat trout in July and from rainbow trout fry in December. This is a common parasite at Hagerman when fish densities are high. Formalin is the approved chemical treatment for external protozoa, and was effective in these cases. Changing pond management (reduced density, frequent cleaning, etc.) is a better solution for external parasites at Hagerman Hatchery.

Recommendations for Hagerman Hatchery in 1995:

1. Complete the bird exclosure structures as quickly as possible.
2. Do not use belt feeders in the hatchery building until the fish are off starter-size feeds to avoid bacterial gill disease (BGD).

HAYSPUR HATCHERY

Intensive sampling and culling of the replacement broodstock pairings was the fish health priority at Hayspur Hatchery this year (Appendix H). Ovarian fluids were collected from every female for virology and modified fluorescent antibody (MFAT)

analysis, and a portion of each population was sacrificed for ELISA, direct fluorescent antibody (DFAT), virology, and whirling disease (WHD) tests. The results for each brood population were as follows:

Gloyd Springs Kamloops

Fifty-seven pairs of Gloyd Springs Kamloops broodstock were tested during January, February, and March (32 pairs were also tested in December, the results of which will be included in the 1995 report). Seventy-seven of the fish from these pairings (38 females and 39 males) were sacrificed for ELISA and DFAT. Overall results from individual sample dates are presented in Appendix I. No viruses were detected; 18 fish were found to carry RS (Table 1). A summary of the various RS test results is presented in Table 2. As a result of the testing, three lots of eggs were culled. In addition, some unusually cloudy ovarian fluids were observed and were inoculated on bacterial media (Appendix H, Accession 94-077). A Pseudomonas species and a Streptococcus were isolated from the ovarian fluids.

A very interesting sidelight on the RS testing was the significant difference in ELISA results between males and females. Only 5.3% of the females tested positive, but 38.5% of the males were positive. The most obvious explanation is the fact that all females were given an intraperitoneal injection of OTC prior to spawning with the intention of reducing vertical transmission of Flexibacter psychrophilus. I have not had the opportunity to research the literature, but my understanding is that feeding OTC has no effect on RS in fresh water. I am not aware, however, of any reports testing injection of the drug, and further research on the subject would be valuable.

Hayspur Rainbow

A total of 205 pairs of Hayspur rainbow trout broodstock from the earthen pond were tested in November and December. Ovarian fluid samples were taken from all females for MFAT. Eighty-three fish (60 hatchery females, 4 feral females, and 19 feral males) were sacrificed for ELISA, DFAT, and 20 WHD tests (Appendix J). No viruses or Myxobolus spores (whirling disease) were detected; a total of 16 females (Table 2) and 10 feral males (Table 3) tested positive for RS. Table 4 shows a comparison of results from the different RS tests.

Following the results of these tests, 21 groups of eggs were culled. Ovarian fluids from 7 females were also inoculated on bacterial media (Appendix H, Accession 94-589). Flexibacter psychrophilus was isolated from one ovarian fluid sample. Modifications made in the criteria for culling eggs intended for future broodstock were fully implemented in 1994. Past culling was done solely on positive virus tests and

Table 1. Summary of Renibacterium salmoninarum tests from replacement Kamloops broodstock, Hayspur Hatchery, January through March, 1994.

| Test method | | Total number of tests | Total positives | Percent positive |
|-------------|---------|-----------------------|-----------------|------------------|
| MFAT: | | 38 | 2 | 5.3 |
| ELISA: | females | 38 | ^a 2 | 5.3 |
| | males | 39 | ^b 15 | 38.5 |
| DFAT: | females | 38 | ^c 1 | 2.6 |
| | males | 39 | 0 | 0.0 |

^a 1 low, 1 moderate. The same 2 fish were positive by MFAT.

^b 12 low, 3 moderate.

^c This individual fish was not positive by any other test.

Table 2. Comparison of ELISA (enzyme-linked immunosorbent assay), DFAT (direct fluorescent antibody), and MFAT (modified fluorescent antibody) tests to detect Renibacterium salmoninarum done on the same female broodstock, Hayspur Hatchery, 1994.

| | Gloyd Springs Kamloops | | Hayspur Strain Rainbow (includes ferals) | |
|-----------------------------|------------------------|--------|--|---------|
| Total number: | 38 | | 64 | |
| Total R.s. positives: | 3 | (7.9%) | 16 | (25.0%) |
| Positive by ELISA: | ^a 2 | (5.3%) | ^b 12 | (18.8%) |
| Positive by MFAT: | 2 | (5.3%) | 7 | (10.9%) |
| Positive by DFAT: | ^c 1 | (2.6%) | 0 | |
| Positive by MFAT and ELISA: | 2 | (5.3%) | 2 | (3.1%) |

^a 1 low, 1 moderate.

^b 10 low, 1 moderate, 1 high.

^c This individual was positive by DFAT only.

Table 3. Results of disease tests on feral male rainbow trout captured below Hayspur Hatchery, November-December, 1994.

| Spawn date | Accession number | ELISA ^a optical density | DFAT | Virus | Whirling disease |
|------------|------------------|---------------------------------------|------|-------|------------------|
| 11/01 | 94-593 | 0.088 | neg. | neg. | neg. |
| | | 0.094 | neg. | neg. | neg. |
| | | 0.098 | neg. | neg. | neg. |
| | | 0.110 | neg. | neg. | neg. |
| | | 0.112 | neg. | neg. | neg. |
| | | 0.115 | neg. | neg. | neg. |
| | | 0.116 | neg. | neg. | neg. |
| | | 0.209 | neg. | neg. | neg. |
| 11/10 | 94-604 | 0.081 ^b | neg. | neg. | neg. |
| | | 0.095 ^b | neg. | neg. | neg. |
| 11/17 | 94-619 | 0.103 | neg. | neg. | neg. |
| | | 0.130 | neg. | neg. | neg. |
| | | 0.148 | neg. | neg. | neg. |
| 12/15 | 94-628 | 0.143 | neg. | neg. | neg. |
| | | 0.143 | neg. | neg. | neg. |

Total ELISA positives = 10 (52.6%), all lows.

^aELISA results are considered negative at optical density ≤ 0.099 , positive low at o.d. 0.100-0.249, positive moderate at o.d. 0.250-0.599, and positive high ≥ 0.600 .

^bELISA samples from this date were pooled in 3-fish lots--6 fish total. Individual samples were tested for DFAT, virus, and WD--all were negative.

Table 4. Summary of Renibacterium salmoninarum tests from replacement female R9 broodstock (including 4 feral females), Hayspur Hatchery, 1994 (1993 numbers in parentheses).

| Test method | Total number of tests | Total positives | Percent positive |
|-------------|-----------------------|----------------------|------------------|
| MFAT | 205 (199) | 20 (27) | 9.8 (13.6) |
| ELISA | 64 (69) | ^a 12 (18) | 18.8 (26.1) |
| DFAT | 64 (69) | 0 (0) | 0.0 (0.0) |

^a 10 lows, 1 moderate, 1 high (14, 4, 0).

Note: None of the feral females were positive by MFAT, but all 4 were positive-low by ELISA.

on positive DFAT results for RS. It has become evident from the experimental use of ELISA and MFAT that DFAT is not sensitive enough to detect most nonclinical infections of RS. The new criteria call for culling eggs from all females which test positive for any virus, from all females which test RS positive by either MFAT or DFAT, and from all which test RS positive by ELISA at optical densities ≥ 0.025 . Data from 1993 and 1994 indicate that it may be possible to adjust the cutoff for culling on ELISA optical densities down to ≥ 0.020 . This more stringent criteria would have resulted in the culling of only three more egg lots (1 hatchery and 2 feral females) over the last two-year period.

Diagnostic examinations were made on the production rainbow on three occasions (Appendix H). Coldwater disease (Flexibacter psychrophilus) was the diagnosis on each occasion. The second examination also found concomitant infection by a Gram-negative, oxidase-negative, non-motile rod which was unidentifiable by standard biochemical tests. The final exam was in late summer when rearing conditions in the large raceways are the worst (low flows, high temperatures). Other factors were environmental stress and infection by external parasites (Gyrodactylus).

Salt treatments (sodium chloride) were frequently used on both production and brood fish. These treatments were intended to reduce external parasites, alleviate bacterial/environmental gill disease, aid in osmoregulation, and generally reduce stress. No empirical data was collected, but hatchery personnel feel that benefits from salt treatments outweigh the minimal cost and effort involved.

Recommendations for Hayspur Hatchery in 1995:

1. Evaluate egg culling protocol for all broodstock replacement lots.
2. Set up a replicated experiment to test hydrogen peroxide as an antifungal treatment for rainbow trout eggs.
3. Construct fencing around the small raceways to exclude birds, mink, otter, and other predators which may carry diseases to the fish on otherwise clean water.

HENRYS LAKE HATCHERY

Disease inspection samples were taken from spawning cutthroat trout at Henrys Lake Hatchery from March 2 through April 11 (Appendix K). Ovarian fluids from female cutthroat trout were tested for viruses (375 females in 75 five-fish pools) and RS (2,530 females in 506 pools). Another group of fish were sacrificed for ELISA, virology, bacteriology, WHD, and Ceratomyxa shasta (CS) tests. All tests were negative for viruses (both tissues and ovarian fluid), WD (0/25), and CS (0/20).

Renibacterium salmoninarum was detected by FAT in three ovarian pools, and 42 of the 52 ELISA samples were positive (41 lows and 1 moderate). Eggs from the FAT-positive pools were discarded. Bacterial samples were taken from 18 fish. Flexibacter psychrophilus was isolated from both spleen and ovarian fluids. Pseudomonas fluorescens was also isolated from ovarian fluids. This was important in the light that many large fluorescing bacteria deemed not to be RS were observed by FAT in many of the ovarian fluid samples. It is possible that these bacteria can mask an actual RS positive or cause a false positive reading. Freezing those ovarian samples intended for FAT would only inhibit proliferation of these bacteria.

Similar samples were taken from spawning brook trout in October and November. A total of 265 ovarian fluid samples were tested for viruses. A random group of fish (including males, unspawned females, and spawned females that were included in the ovarian samples) were sacrificed for DFAT, ELISA, WD, tissue virology, and bacterial tests. All fish tested were negative for viruses and WD. One kidney sample was positive (high) by DFAT, and the ELISA pool which contained that individual fish was also positive (moderate). Bacterial samples from 24 fish were positive for Aeromonas sobria (6 fish), Pseudomonas fluorescens (2 fish), and Sphingomonas paucinobilis (2 fish). Aeromonas salmonicida, the causative agent of furunculosis, was not found.

The significance of broodstock evaluation at Henrys Lake has become evident from the furunculosis outbreak at Ashton Hatchery in September 1993 and from the finding of RS (DFAT) among the rainbow x cutthroat hybrids at Hagerman in January 1994.

Recommendations for Henrys Lake Hatchery in 1995:

1. Apply stringent disinfection to eggs and equipment to prevent a recurrence of the furunculosis problem.
2. Work with Eagle Fish Health Laboratory to refine sample storage and shipping techniques.

KOOTENAI HATCHERY

Fish health at Kootenai Hatchery was excellent in 1994. No out-breaks of bacterial gill disease or any other disease were reported to the Eagle Fish Health Laboratory. A pathologist from the Eagle Lab visited the facility twice in 1994, but no fish were sacrificed for samples. The pathologist spent one day with the hatchery manager in an unsuccessful attempt to capture wild broodstock from the Kootenai River.

One set of samples was sent directly from the hatchery to Eagle Laboratory to be checked for signs of white sturgeon iridovirus (WSIV). No signs of WSIV were detected (Appendix L) (Accession 94-168). This group served as a negative control for fish transferred to the Clear Springs Laboratory (a commercial facility located near Buhl, Idaho). Dr. Scott LaPatra performed various experiments with stress induction to determine if histological signs of WSIV would appear, if clinical signs can be induced, and if any treatments would be effective. Results of tests run on the Kootenai fish at Clear Springs are included in Appendix L.

Recommendations for Kootenai Hatchery in 1995:

1. Cooperate with Eagle and Clear Springs laboratories in testing fish for white sturgeon iridovirus.
2. Notify pathologists if and when adult fish are to be captured so that disease samples may be collected from wild populations.

MACKAY HATCHERY

Mackay Hatchery was visited in April 1994. Groups of fish examined included the rainbow catchables (Arlees), the brown trout, the kokanee, and the McCall westslope cutthroat trout (Appendix M). The only pathogen detected, at light or carrier levels, was Flexibacter psychrophilus in the rainbow. Clinical disease was not observed at Mackay. The kokanee, cutthroat, and rainbow samples all tested negative for Myxobolus cerebralis, the agent that causes whirling disease.

Mackay and American Falls hatcheries are the only two facilities in the IDFG system with Class A "Quarantine" classification. This can be attributed to the facility designs, the clean water sources, and to the professionalism of the hatchery personnel. The benefits of Class A status to the Department include more leeway for statewide redistribution, better survival of fish after stocking, and less contribution to the transmission of pathogens/diseases to wild or native fish populations. Maintenance of this status is highly desirable for Mackay Hatchery. Therefore, more caution should be taken in importing eggs from disease-contaminated sources. Of specific concern are the Deadwood early-spawning kokanee, which are known to carry R. salmoninarum and would almost certainly break with clinical BKD if they were held on the hatchery long enough, and the cutthroat trout from Henrys Lake which are also known to carry RS. The programs at Mackay should be re-evaluated in this light, and changes made where only disease-free fish are hatched and reared at this facility. Birds are not a significant depredation problem like they are at other hatcheries, but the potential for disease transfer is still quite real because of the proximity of a private hatchery.

Recommendations for Mackay Hatchery in 1995:

1. Re-evaluate the Mackay Hatchery programs. Look for disease-free eggs to maintain Mackay's production.
2. Compare costs and effectiveness of bird screens constructed at Nampa and Hagerman hatcheries. Build bird screens of best design.

MCCALL HATCHERY RESIDENT PROGRAM

The spawning westslope cutthroat trout at Fish Lake were sampled by Eagle pathologists on May 12 (Appendix N). The fish were negative for replicating viruses, but 27 of 30 (90.0%) were positive for Renibacterium salmoninarum by ELISA (all lows). These results were almost identical with those from 1993 (VIRO negative; ELISA 26 of 30 for 87%, all lows). No clinical signs of BKD were observed in either year.

Eye-up of cutthroat eggs was poor this year. High water temperatures (65-70°F) during spawning was a very likely reason for this problem. Some efforts to improve shade over the creek would lower water temperatures year-round and improve general health of the lake system.

Recommendations for the 1995 program:

1. Develop a plan, in cooperation with regional biologists, to improve the riparian cover over Fish Lake Creek in order to lower water temperatures.
2. Consider implementing a genetic maintenance/disease culling protocol for fish going back into Fish Lake.

NAMPA HATCHERY

Pathologists from the Eagle Fish Health Laboratory visited the hatchery on 12 occasions in 1994. In addition, the kokanee spawned by Nampa personnel at Deadwood Reservoir were also inspected (Appendix O). Gas bubble disease was not identified as a problem this year, as a new degassing tower is now on line. However, it is possible that undetected episodes of gas bubble disease are still occurring. When total dissolved gas (TDG) is at 101-102% of saturation (which is usually within the tolerance range for fish), a sudden drop in barometric pressure can cause the TDG to briefly rise several percentage points and exceed tolerance levels. This could cause

formation of small gas bubbles and subsequent tissue damage. This may not be a direct cause of mortality, but may predispose the fish to the bacterial infections which are very common at Nampa.

Fall chinook eggs from Wolf Lodge Creek (Lake Pend Oreille) were brought to Nampa Hatchery in November 1993. Survival of the eggs and early fry was not good through the end of December, possibly because the water temperature at Nampa Hatchery is above optimum for this species. The fry and fingerlings were sampled in January, February, and March 1994 because of continued high mortality. The hatchery personnel were concerned about BKD because they observed bilateral exophthalmia and distended abdomens. No Renibacterium was detected. Instead, motile aeromonads were found. This was a good lesson in the fact that external signs are not adequate for most diagnoses.

The Manchester brown trout fingerling were diagnosed with motile aeromonad septicemia (MAS) in February. Two different isolates of Aeromonas hydrophila were found which had slightly different biochemistry and colony morphology. Of more significance was the fact that one isolate was much more resistant to OTC than the other. If the first should become more prevalent on the hatchery, then the use of medicated feed may become ineffective.

Various lots of rainbow trout and Kamloops were sampled over the course of the year, primarily for bacterial infections. The major bacterial pathogens at Nampa are Flexibacter psychrophilus and Aeromonas hydrophila. Oxytetracycline is legal to treat only the latter, and so there were a few episodes of CWD (Flexibacter infection) that had to go untreated. An INAD permit to use OTC for CWD will be in place for 1995.

Included in the inspections were the replacement broodstock for Hayspur Hatchery (Appendix 0) (Accessions 94-358 and 94-382). The Kamloops were found to be RS carriers by ELISA (2/60 lows) but carried no other pathogens. The Hayspur rainbow broodstock tested negative for RS, but were found to carry low levels of other bacteria (Aeromonas and Pseudomonas species).

A group of Gerrard rainbow fingerling were imported to Nampa Hatchery from Canada. The laboratory was soon called because there were losses in the fish. The diagnosis was CWD and MAS. However, I discovered that the proper steps for legal importation of these fish (specifically Title 50 disease certification) had not been followed. This was brought to the attention of the Resident Hatchery Supervisor and the Hatchery Manager in the Boise Office. Following their instructions, the Gerrards and the rainbow fry in both adjacent raceways were destroyed and the raceways chlorinated.

The completion of bird netting over the entire hatchery is an accomplishment for which the hatchery personnel deserve congratulations. The net will not only

reduce depredation losses but should also reduce the transfer of pathogens on the facility and could eventually lead to an upgrade in the hatchery's disease classification.

Recommendations for Nampa Hatchery in 1995:

1. Be more cautious in importing potentially pathogen-carrying eggs and fish on to the hatchery.
2. Monitor TDG on a routine schedule, paying particular attention to the periods immediately following the passage of a storm front.
3. Implement a training schedule for all employees on the importance of disease isolation techniques between lots of fish and enforce these best practices.

SANDPOINT HATCHERY

Pathologists for the Eagle Fish Health Laboratory visited the hatchery on three occasions in 1993. However, with the reduction in activity at the facility, no fish were sampled. Any fish on station during the visits were visually inspected. No abnormalities were observed. The pathologist assisted in loading and transferring a group of sturgeon to the Kootenai Hatchery during the May visit.

APPENDICES

List of abbreviations and symbols used in Appendixes A through O.

- Test results for the sample group were negative. Does not necessarily mean that the pathogen was not present, just that it was undetected in the sample.
- + Indicates test results for the sample group were positive.
- () A blank indicates the lot was not tested for the indicated pathogen.

| | |
|--------|---|
| BACTE | Bacteriology |
| BGD | Bacterial Gill Disease |
| BKD | Bacterial Kidney Disease (<u>Renibacterium salmoninarum</u>) |
| BS | Bacterial Septicemia (<u>Aeromonas</u> , <u>Pseudomonas</u> , or other groups of bacteria) |
| CSH | <u>Ceratomyxa shasta</u> |
| CWD | Coldwater Disease (<u>Flexibacter psychrophilus</u>) |
| DX | Diagnostic (sampled because of sick fish) |
| EGD | Environmental Gill Disease |
| ELISA | Enzyme-Linked Immunosorbant Assay |
| EIBS | Erythrocytic Inclusion Body Syndrome virus |
| ERM | Enteric Redmouth Disease (<u>Yersinia ruckeri</u>) |
| FAT | Fluorescent Antibody Test (for RS) |
| FUR | Bacterial Furunculosis (<u>Aeromonas salmonicida</u>) |
| GBD | Gas Bubble Disease |
| ICH | <u>Ichthyophthirius multifiliis</u> |
| IHN(V) | Infectious Hematopoietic Necrosis (virus) |
| IPN(V) | Infectious Pancreatic Necrosis (virus) |
| IX | Inspection (routine hatchery visit) |
| MAS | Motile Aeromonad Septicemia |
| MFAT | Membrane-filtration Fluorescent Antibody Test (for RS) |
| NSG | Nonsignificant Growth |
| PKD | Proliferative Kidney Disease (PKX organism) |
| RS | <u>Renibacterium salmoninarum</u> --tested positive without signs of clinical BKD |
| TEM | Transmission Electron Microscopy |
| VIRO | Virology |
| WHD | Whirling Disease (<u>Myxosoma cerebralis</u>) |
| WF | Wild Fish inspection |
| WSIV | White Sturgeon Iridovirus |

Appendix A. Summary report of Eagle Fish Health Laboratory results for American Falls Hatchery (Class A). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|---------|---------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1994 | Hayspur | Rainbow trout | 94-104 | - | - | | - | - | - | - | | | | | | IX: Negative for pathogens; FAT 0/20, BACTE NSG, VIRO 0/20 |
| 1994 | Hayspur | Rainbow trout | 94-308 | | | | | - | - | + | | | | | | DX: CWD, Bacteremia; F. <u>psychrophilus</u> 8/12 <u>Pseudomonas</u> 1/12 |
| 1994 | Hayspur | Rainbow | 94-500 | - | - | | + | - | - | - | | | | | | IX: RS; ELISA 3/12 pools (2 low, 1 mod), BACTE 0/8, VIRO 0/60, WHD 0/20 |

Appendix B. Summary report of Eagle Fish Health Laboratory results for Ashton Hatchery (Class B). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|--------------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1992 | Hayspur | Rainbow trout | 94-099 | - | - | | - | - | - | - | | | | | | IX: Negative for pathogens; VIRO 0/20, BACTE NSG. |
| 1992 | Wizard Falls | Atlantic salmon | 94-100 | - | - | | + | - | - | - | | | | | | IX: RS; ELISA 4/4 (low), FAT 0/10, VIRO 0/20, BACTE NSG. |
| 1993 | Henry's Lake | Brook trout | 94-101 | - | - | | | | | | | | | | | DX: Undetermined etiology; VIRO 0/20 |
| 1993 | Henry's Lake | Brook trout | 94-338 | - | - | | | - | - | - | | | | | | IX: MAS; VIRO 0/20 A. <u>hydrophila</u> 5/16, <u>Pseudomonas</u> sp. 1/16 |
| 1993 | Colorado | Rainbow trout | 94-503 | - | - | | - | - | - | - | | | - | | | IX: Bacteremia; <u>Pseudomonas</u> sp. 1/8, VIRO 0/60, ELISA 0/60 |
| 1993 | Henry's Lake | Brook trout | 94-504 | - | - | | - | - | - | - | | | | | | IX: Negative for pathogens; VIRO 0/20, ELISA 0/20, BACTE 0/4 |
| 1992 | Colorado | Rainbow trout | 94-505 | - | - | | + | - | - | - | | | - | | | IX: RS; VIRO 0/60, ELISA 3/12 pools low, BACTE 0/12, WHD 0/20 |
| 1993 | Wizard Falls | Atlantic salmon | 94-506 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/1, ELISA 1/1 low |
| 1994 | Hayspur | Rainbow trout | 94-500 | - | - | | + | - | - | - | | | - | | | IX: RS; ELISA 3/12 pools (2 low, 1 mod), BACTE 0/8, VIRO 0/60, WHD 0/20 |

Appendix C. Summary report of Eagle Fish Health Laboratory results for Cabinet Gorge Hatchery (Class C). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|------------------|----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1994 | Hayspur | Rainbow trout | 94-150 | - | - | | | - | - | - | | | | | | IX: Bacteremia; <u>Pseudomonas aureofaciens</u> 3/4 (light), CWD 0/20 VIRO 0/20 |
| 1993 | Deadwood | Kokanee salmon | 94-156 | - | - | | | | | | | | | | | IX: Negative for pathogens; VIRO 0/20 |
| 1993 | Sullivan Springs | Kokanee salmon | 94-157 | - | - | | | - | - | - | | | | | | IX: Negative for pathogens; VIRO 0/20, BACTE NSG |
| Brood | Sullivan Springs | Kokanee salmon | 94-645 | - | - | | + | - | - | - | | | | | | IX: Bacteremia, RS; <u>F. psychrophilus</u> , <u>P. fluorescens</u> , ELISA 3/12 pools (low), FAT 0/60, VIRO 0/60, WHD 0/20 |
| Brood | Clark Fork R. | Kokanee salmon | 94-646 | - | - | | + | - | - | - | | | | | | IX: Bacteremia, RS; <u>Pseudomonas</u> sp. 12/12 ELISA 3/12 pools low, FAT 0/60, VIRO 0/60, WHD 0/20 |
| 1994 | Hayspur | Rainbow | 94-500 | - | - | | + | - | - | - | | | | | | IX: RS; ELISA 3/12 pools (2 low, 1 mod), BACTE 0/8, VIRO 0/60, WHD 0/20 |

Appendix D. Summary report of Eagle Fish Health Laboratory results for Clark Fork Hatchery (Class C). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1992 | Clark Fork | Cutthroat trout | 94-158 | - | + | | + | - | - | - | | - | | | | IX:BKD, IPN; IPNV 4/6 ELISA 1 /6 (low), FAT 0/30, BACTE NSG, WHD 0/20 |
| 1992 | Hayspur | Rainbow trout | 94-159 | - | - | | + | - | - | - | | - | | | | IX: RS, One fish with nephrocalcinosis; ELISA 1 /6 low, FAT 0/30, VIRO 0/30, BACTE NSG, WHD 0/20 |
| 1989 | Washoe Park | Cutthroat trout | 94-272 | - | - | | + | | | | | | | | | IX: BKD; FAT 1/20 (heavy), ELISA 9/20 (8 low, 1 high), VIRO 0/40 |
| 1990 | Washoe Park | Cutthroat trout | 94-273 | - | + | | + | | | | | - | | | | IX:IPN, RS; IPNV 2/24 tissues & 0/35 OF, ELISA 13/24 (5 low, 3 mod, 5 high), FAT 5/24 (3 highs), WHD 0/20 |
| 1994 | Hayspur | Rainbow trout | 94-434 | - | + | | | - | - | + | | | | | | DX: MAS, CWD, IPNV carrier, Bacteremia (<u>Pseudomonas</u>); IPNV 1 /2 5-fish pools, CWD 1/8, MAS 2/8 |
| 1994 | Washoe Park | Cutthroat trout | 94-435 | - | + | | | - | - | - | | | | | | DX: IPN; IPNV 7/7 5-fish pools, BACTE NSG |
| 1993 | Henrys Lake | Brook trout | 94-445 | - | + | | | - | - | - | | | | | | DX: IPN, EGD; IPNV 2/2 5-fish pools, BACTE NSG |

Appendix D. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|----------------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Wild fish | Spring Creek | Brook trout | 94-446 | - | + | | + | | | | | - | | | | WF: IPNV carrier, RS: FAT 0/30, ELISA 12/12 pools (3 low, 7 mod, 2 high), IPNV 4/16 pools, WHD 0/40 |
| Brood | Wolf Lodge Cr. | Fall chinook | 94-487 | - | - | | - | | | | | | | | | IX: Negative for pathogens; ELISA & VIRO 0/2 |
| Brood | Wolf Lodge Cr. | Fall chinook | 94-495 | - | - | | - | | | | | | | | | IX: Negative for pathogens; ELISA & VIRO 0/7 |
| Brood | Wolf Lodge Cr. | Fall chinook | 94-507 | - | - | | - | | | | | | | | | IX: Negative for pathogens; ELISA & VIRO 0/4 |
| Brood | Wolf Lodge Cr. | Fall chinook | 94-513 | - | - | | - | | | | | | | | | IX: Negative for pathogens; ELISA & VIRO 0/11 |
| Brood | Wolf Lodge Cr. | Fall chinook | 94-523 | - | - | | - | | | | | | | | | IX: Negative for pathogens; ELISA 0/16 VIRO 0/15 |
| 1994 | Hayspur | Kamloops trout | 94-647 | - | - | | | | | | | | | | | DX: Open case; VIRO 0/15, HISTO ? |
| 1994 | Washoe Park | Cutthroat trout | 94-648 | - | + | | + | - | - | - | | | | | | IX: IPNV, BKD; FAT 2/2, VIRO 4/4 (pools) P. <u>fluorescens</u> 1/1 |

Appendix E. Summary report of Eagle Fish Health Laboratory results for Clearwater Hatchery--Resident Program (Class CI. January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|--------------|---------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1992 | Black Canyon | Rainbow trout | 94-026 | - | - | | - | - | - | - | | | | | | IX: Bacteremia; FAT 0/60, ELISA 0/60, VIRO 0/60, <u>Pseudomonas paucimobilis</u> 5/12 |

Appendix F. Summary report of Eagle Fish Health Laboratory results for Grace Hatchery (Class B). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------|-----------------------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 1993 | Bear Lake | Cutthroat trout | 94-102 | - | - | | - | - | - | - | | - | | | | IX:Negative for pathogens; ELISA 0/60 FAT 0/60, VIRO 0/60 WHD 0/20 |
| 1993 | Henrys Lake | Rainbow x Cutthroat hybrids | 94-103 | - | - | | - | - | - | - | | - | | | | IX:Negative for pathogens; ELISA 0/60 FAT 0/60, VIRO 0/60, WHD 0/20, BACTE NSG |
| 1994 | Hayspur | Rainbow trout | 94-236 | - | - | | - | - | - | + | | | | | | DX: CWD; VIRO 0/15, FAT 0/12, F. <u>psychrophilus</u> 8/12 |
| 1994 | Hayspur | Rainbow trout | 94-502 | - | - | | - | - | - | + | | | | | | IX: CWD; VIRO 0/20, ELISA 0/20, F. <u>psychrophilus</u> 2/8 |
| 1993 | Hayspur | Rainbow trout | 94-501 | - | - | | + | - | - | - | | - | | | | IX: RS; VIRO 0/60 ELISA 4/12 pools low, WHD 0/20, BACTE 0/8 |

Appendix G. Summary report of Eagle Fish Health Laboratory results for Hagerman Hatchery (Class C). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|--------------|-----------------------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 1993 | Henry's Lake | Rainbow x cutthroat hybrids | 94-030 | - | - | | - | - | - | - | | | | | | DX: <u>Columnaris</u> ; VIRO 0/10, FAT 0/10, ELISA 0/2, <u>Flexibacter columnaris</u> 4/8 |
| 1994 | Hayspur | Kamloops trout | 94-031 | - | - | | | - | - | + | | | | | | DX: CWD, BS, EGD; <u>F. psychrophilus</u> 2/12, <u>Sphingobacter paucimobilis</u> 4/12, VIRO 0/20 |
| 1994 | Hayspur | Rainbow trout | 94-050 | - | - | | | - | - | - | | | | | | DX: Negative for pathogens, suspect EGD/BGD; VIRO 0/10, BACTE NSG |
| 1993 | Hayspur | Kamloops trout | 94-051 | - | - | | | - | - | - | | | | | | DX: Undetermined etiology; BACTE NSG, VIRO 0/1 |
| 1993 | Henry's | Rainbow x cutthroat hybrids | 94-052 | - | - | | | + | | | | | | | | IX: RS; ELISA 0/35, FAT 3/35 , VIRO 0/35, BACTE NSG |
| 1994 | Hayspur | Rainbow trout | 94-073 | - | - | | | - | - | - | | | | | | DX: MAS, CWD, BS; <u>F. psychrophilus</u> 1/8, <u>A. hydrophila</u> 2/8, <u>A. caviae</u> 1/8, <u>Pasteurella</u> sp. 1/8, VIRO 0/20 |
| 1993 | Hayspur | Rainbow trout | 94-105 | + | - | | | | | + | | | | | | DX: IHN, CWD, MAS; <u>F. psychrophilus</u> 2/12 <u>A. hydrophila</u> 1/12 IHNV 1/4 |

Appendix G. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------|----------------------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1993 | Hayspur | Rainbow trout - | 94-200 | + | - | | | - | - | - | - | | | | | DX: IHN, MAS; IHNV 2/5 pools, Motile Aeromonad in ascites of one fish, PKX 0/10, <u>Enterocytozoan</u> 0/10 |
| 1993 | Trout Lodge | Kamloops x Steelhead cross | 94-284 | + | - | | + | - | - | - | - | | | | | IX: IHNV, RS; IHNV 1/3 pools, ELISA 1/15 (low), FA 0/15, PKX 0/8 |
| 1994 | Trout Lodge | Kamloops trout | 94-285 | - | - | | | - | - | - | - | | | | | DX: EGD; VIRO 0/15, BACTE NSG |
| 1994 | Hayspur | Rainbow trout | 94-286 | - | - | | | - | - | + | | | | | | DX: MAS, CWD; VIRO 0/15, <u>E. psychrophilus</u> 7/8, <u>Aeromonas</u> 5/8, <u>Pseudomonas</u> 1/8 |
| 1994 | Hayspur | Rainbow trout | 94-307 | | | | | - | - | + | | | | | | DX: CWD, MAS; <u>E. psychrophilus</u> 5/12 (OTC resistant), <u>Aeromonas</u> sp. 5/12 |
| 1994 | Henrys Lake | Cutthroat trout | 94-348 | - | - | | | - | | | | | | | | DX: Costiasis (Ichthyobodiasis), MAS, Mycosis; VIRO 0/15, <u>Aeromonas</u> 4/4, Fungus 3/4 |
| 1993 | Trout Lodge | Kamloops x Steelhead cross | 94-349 | - | + | | - | - | - | - | | | | | | IX: IPNV, MAS, PKX (suspect); IPNV 1/10 carrier, ELISA 0/10, <u>Aeromonas</u> sp. 1/8, PKD 0/2 |

Appendix G. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------------------|-----------------------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1994 | Trout Lodge | Rainbow trout | 94-465 | - | - | | | - | - | + | | | | | | DX: MAS, CWD, BS; <u>A. hydrophila</u> 9/12, <u>F. psychrophilus</u> 6/12, <u>Hafnia alvei</u> 6/12 |
| 1994 | Trout Lodge | Rainbow x cutthroat hybrids | 94-527 | - | - | | | - | - | + | | | | | | DX: CWD, Mixed Bacteremia; <u>Flexibacter psychrophilus</u> 1/8, VIRO 0/9 |
| 1994 | Harrison Lake (Montana) | Rainbow trout | 94-528 | - | - | | | - | - | + | | | | | | DX: CWD, MAS; VIRO 0/10, <u>F. psychrophilus</u> 4/8, <u>Aeromonas hydrophila</u> 1/8 |
| 1994 | Trout Lodge | Kamloops trout | 94-529 | - | - | | | - | - | - | | | | | | DX: Environmental stress/gill disease, Bacteremia (low) |
| 1994 | Hayspur | Rainbow trout | 94-578 | - | - | | | - | - | - | | | | | | DX: Environmental stress (moving), Bacteremia; VIRO 0/20, <u>A. hydrophila</u> 1/12, <u>Pseudomonas</u> sp. 1/12, <u>Flexibacter</u> sp. 1/12 |
| 1994 | Hayspur trout | Rainbow trout | 94-638 | + | - | | | - | - | - | | | | | | DX: IHN, CWD, MAS, presumed Columnaris (Flexibacteriosis), Secondary mycosis; IHNV 3/3 pools, <u>Flexibacter</u> sp. 7/8, <u>Aeromonas hydrophila</u> 1/8, <u>A. caviae</u> 4/8, <u>Pseudomonas</u> 2/8 |

Appendix G. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|---------|---------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 1994 | Hayspur | Rainbow trout | 94-639 | + | - | | | - | - | - | | | | | | DX: IHN, MAS, Columnaris (Flexibacteriosis); IHNV 1/1 pools, <u>Aeromonas hydrophila</u> 2/4, <u>Pseudomonas</u> sp. 3/4, <u>E. columnaris</u> 2/4 |
| 1994 | Hayspur | Rainbow trout | 94-649 | - | - | | | | | | | | | | | DX: BGD/EGD (sestonosis), Costiasis (Ichthyobodiasis); VIRO 0/20 |

Appendix H. Summary report of Eagle Fish Health Laboratory results for Hayspur Hatchery (Class C). January 1 - December 31, 1994

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|---------------|----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Brood | Gloyd Springs | Kamloops trout | 94-064 | | - | | + | | | | | | | | | IX: RS; VIRO 0/21, ELISA 7/21 (4low,3mod) MFAT 0/10, FAT 0/21 |
| Brood | Gloyd Springs | Kamloops trout | 94-077 | - | - | | + | | | | | | | | | IX: RS, BS; VIRO 0/22 ELISA 3/22 (2low,1mod) MFAT 1/11, FAT 0/22, <u>Pseudomonas</u> 1/22, <u>Streptococcus</u> 1/22 |
| Brood | Gloyd Springs | Kamloops trout | 94-095 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/34, ELISA 9/34 (all low), MFAT 1/17, FAT 1/34 |
| Brood | Gloyd Springs | Kamloops trout | 94-1 18 | - | - | | - | | | | | | | | | IX: Negative for pathogens; VIRO 0/11, MFAT 0/11 |
| 1994 | Hayspur | Rainbow trout | 94-136 | - | - | | | - | - | + | - | | | | | DX: CWD; VIRO 0/30, <u>F. psychrophilus</u> 6/12 PKX 0/4 |
| Brood | Gloyd Springs | Kamloops trout | 94-138 | - | - | | - | | | | | | | | | IX: Negative for pathogens; VIRO 0/8, MFAT 0/8 |
| 1994 | Hayspur | Rainbow trout | 94-177 | - | - | | + | - | - | + | | | | | | DX: CWD, Septicemia; VIRO 0/30, <u>F. psychrophilus</u> 5/8, Non-ID oxidative rod 4/8 |
| 1994 | Hayspur | Rainbow trout | 94-512 | | | | | - | - | + | | | | | | DX: Environmental stress, CWD, Single Parasitism (<u>Gyrodactylus</u>); <u>F. psychrophilus</u> 5/12 |

Appendix H. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|--------------------------------------|---------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Brood | Hayspur | Rainbow trout | 94-560 | - | - | | + | | | | | - | | | | IX: RS; VIRO 0/17, ELISA 1/10 (low), FAT 0/10, MFAT 0/17, WHD 0/10 |
| Brood | Hayspur | Rainbow trout | 94-589 | - | - | | - | - | - | + | | - | | | | IX: CWD; VIRO 0/30, ELISA 0/10, FAT 0/10 MFAT 0/30, WHD 0/10, <u>E. psychrophilus</u> 1/7 |
| Brood | Hayspur (feral males) | Rainbow trout | 94-593 | - | - | | + | | | | | - | | | | IX: RS; VIRO 0/8, WHD 0/8, FAT 0/8, ELISA 5/8 (all low) |
| Brood | Hayspur | Rainbow trout | 94-603 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/52, ELISA 2/10 (lows), FAT 0/10, MFAT 5/52 |
| Brood | Hayspur (feral males) | Rainbow trout | 94-604 | - | - | | - | | | | | - | | | | IX: Negative for pathogens; VIRO 0/6, ELISA 0/6, FAT 0/6, WHD 0/6 |
| Brood | Hayspur | Rainbow trout | 94-618 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/50, ELISA 0/10, FAT 0/10 MFAT 4/48 |
| Brood | Hayspur (feral males and females) | Rainbow trout | 94-619 | - | - | | + | | | | | - | | | | IX: RS; VIRO 0/5, ELISA 5/5 (low) FAT 0/5, MFAT 0/2, WHD 0/5 |
| Brood | Hayspur (feral males and females) | Rainbow trout | 94-628 | - | - | | + | | | | | - | | | | IX: RS; VIRO 0/4, ELISA 4/4 (low), FAT 0/4, MFAT 0/2, WI-ID 0/4 |
| Brood | Hayspur | Rainbow trout | 94-629 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/34, ELISA 2/10(1low,1mod) FAT 0/10, MFAT 6/34 |

Appendix H. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|---------------|----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Brood | Hayspur | Rainbow trout | 94-644 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/20, ELISA 0/10, FAT 0/10, MFAT 5/20 |
| Brood | Gloyd Springs | Kamloops trout | 94-655 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/19, ELISA 0/13, FAT 0/13, MFAT 3/18 |
| Brood | Gloyd Springs | Kamloops trout | 94-664 | - | - | | + | | | | | | | | | IX: RS; VIRO 0/12, ELISA 1/12, FAT 0/12, MFAT 1/12 |

Appendix I. Individual disease sample results from female Gloyd Springs Kamloops trout during paired spawning. Hayspur Hatchery, January-March, 1994.

| Sample date | Fish number | ELISA o.d. ^a | MFAT ^b | DFAT ^b | Virus | Culled |
|-------------|-------------|-------------------------|-------------------|-------------------|-------|--------|
| 01/31 | 1 | 0.072 | 0 | 0 | neg. | |
| | 2 | 0.063 | 0 | 0 | neg. | |
| | 3 | 0.067 | 0 | 0 | neg. | |
| | 4 | 0.075 | 0 | 0 | neg. | |
| | 5 | 0.073 | 0 | 0 | neg. | |
| | 6 | 0.065 | 0 | 0 | neg. | |
| | 7 | 0.070 | 0 | 0 | neg. | |
| | 8 | 0.068 | 0 | 0 | neg. | |
| | 9 | 0.062 | 0 | 0 | neg. | |
| 02/09 | 10 | 0.063 | 0 | 0 | neg. | |
| | 11 | 0.070 | 0 | 0 | neg. | |
| | 12 | 0.061 | 0 | 0 | neg. | |
| | 13 | 0.063 | 0 | 0 | neg. | |
| | 14 | 0.064 | 0 | 0 | neg. | |
| | 15 | 0.057 | 0 | 0 | neg. | |
| | 16 | 0.071 | 0 | 0 | neg. | |
| | 17 | 0.086 | 0 | 0 | neg. | |
| | 18 | 0.061 | 0 | 0 | neg. | |
| 02/22 | 19 | 0.073 | 0 | 0 | neg. | |
| | 20 | 0.331 | 21 | 0 | neg. | x |
| | 21 | 0.065 | 0 | 0 | neg. | |
| | 22 | 0.070 | 0 | 1 | neg. | x |
| | 23 | 0.078 | 0 | 0 | neg. | |
| | 24 | 0.069 | 0 | 0 | neg. | |
| | 25 | 0.073 | 0 | 0 | neg. | |
| | 26 | 0.065 | 0 | 0 | neg. | |
| | 27 | 0.066 | 0 | 0 | neg. | |
| 28 | 0.083 | 0 | 0 | neg. | | |
| 03/10 | 29 | 0.070 | 0 | 0 | neg. | |
| | 30 | 0.076 | 0 | 0 | neg. | |
| | 31 | 0.062 | 0 | 0 | neg. | |
| | 32 | 0.145 | 3 | 0 | neg. | x |
| | 33 | 0.069 | 0 | 0 | neg. | |
| | 34 | 0.078 | 0 | 0 | neg. | |
| | 35 | 0.066 | 0 | 0 | neg. | |
| | 36 | 0.071 | 0 | 0 | neg. | |
| | 37 | 0.078 | 0 | 0 | neg. | |
| 03/10 | 38 | 0.069 | 0 | 0 | neg. | |
| | 39 | N.A. | 0 | N.A. | neg. | |
| | 40 | N.A. | 0 | N.A. | neg. | |

Appendix I. Continued.

| Sample date | Fish number | ELISA o.d. ^a | MFAT ^b | DFAT ^b | Virus | Culled |
|-------------|-------------|-------------------------|-------------------|-------------------|-------|--------|
| 03/10 | 41 | N.A. | 0 | N.A. | neg. | |
| | 42 | N.A. | 0 | N.A. | neg. | |
| | 43 | N.A. | 0 | N.A. | neg. | |
| | 44 | N.A. | 0 | N.A. | neg. | |
| | 45 | N.A. | 0 | N.A. | neg. | |
| | 46 | N.A. | 0 | N.A. | neg. | |
| | 47 | N.A. | 0 | N.A. | neg. | |
| | 48 | N.A. | 0 | N.A. | neg. | |
| | 49 | N.A. | 0 | N.A. | neg. | |
| 03/21 | 50 | N.A. | 0 | N.A. | neg. | |
| | 51 | N.A. | 0 | N.A. | neg. | |
| | 52 | N.A. | 0 | N.A. | neg. | |
| | 53 | N.A. | 0 | N.A. | neg. | |
| | 54 | N.A. | 0 | N.A. | neg. | |
| | 55 | N.A. | 0 | N.A. | neg. | |
| | 56 | N.A. | 0 | N.A. | neg. | |
| | 57 | N.A. | 0 | N.A. | neg. | |

^aOptical density

^bOrganisms per 30 fields

Appendix J. Individual disease sample results from female Hayspur-strain rainbow trout during paired spawning. Hayspur Hatchery, October-December, 1994. (Feral females denoted by "f")

| Sample date | Fish number | ELISA o.d. ^a | MFAT ^b | DFAT ^b | Virus | W.D. | Culled |
|-------------|-------------|-------------------------|-------------------|-------------------|-------|------|--------|
| 10/20 | 1 | 0.088 | 0 | 0 | neg. | neg. | |
| | 2 | 0.099 | 0 | 0 | neg. | neg. | |
| | 3 | 0.094 | 0 | 0 | neg. | neg. | |
| | 4 | 0.088 | 0 | 0 | neg. | neg. | |
| | 5 | 0.083 | 0 | 0 | neg. | neg. | |
| | 6 | 0.083 | 0 | 0 | neg. | neg. | |
| | 7 | 0.088 | 0 | 0 | neg. | neg. | |
| | 8 | 0.098 | 0 | 0 | neg. | neg. | |
| | 9 | 0.102 | 0 | 0 | neg. | neg. | |
| | 10 | 0.079 | 0 | 0 | neg. | neg. | |
| | 11 | N.A. | 0 | 0 | neg. | N.A. | |
| | 12 | N.A. | 0 | 0 | neg. | N.A. | |
| | 13 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 14 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 15 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 16 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 17 | N.A. | 0 | N.A. | neg. | N.A. | |
| 11/01 | 18 | 0.072 | 0 | 0 | neg. | neg. | |
| | 19 | 0.070 | 0 | 0 | neg. | neg. | |
| | 20 | 0.076 | 0 | 0 | neg. | neg. | |
| | 21 | 0.082 | 0 | 0 | neg. | neg. | |
| | 22 | 0.067 | 0 | 0 | neg. | neg. | |
| | 23 | 0.073 | 0 | 0 | neg. | neg. | |
| | 24 | 0.075 | 0 | 0 | neg. | neg. | |
| | 25 | 0.075 | 0 | 0 | neg. | neg. | |
| | 26 | 0.075 | 0 | 0 | neg. | neg. | |
| | 27 | 0.082 | 0 | 0 | neg. | neg. | |
| | 28 | N.A. | 0 | 0 | neg. | N.A. | |
| | 29 | N.A. | 0 | 0 | neg. | N.A. | |
| | 30 | N.A. | 0 | 0 | neg. | N.A. | |
| | 31 | 0.099 | 1 | 0 | neg. | N.A. | |
| | 32 | 0.067 | 1 | 0 | neg. | N.A. | |
| | 33 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 34 | N.A. | 0 | N.A. | neg. | N.A. | |
| 35 | N.A. | 0 | N.A. | neg. | N.A. | | |
| no sample | 36 | * | * | * | * | * | x |
| | 37 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 38 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 39 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 40 | N.A. | 0 | N.A. | neg. | N.A. | |

Appendix J. Continued.

| Sample date | Fish number | ELISA o.d. ^a | MFAT ^b | DFAT ^b | Virus | W.D. | Culled |
|-------------|-------------|-------------------------|-------------------|-------------------|-------|------|--------|
| 11/01 | 41 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 42 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 43 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 44 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 45 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 46 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 47 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 48 | N.A. | 0 | N.A. | neg. | N.A. | |
| 11/10 | 49 | 0.077 | 0 | 0 | neg. | N.A. | |
| | 50 | 0.078 | 0 | 0 | neg. | N.A. | |
| | 51 | 0.105 | 0 | 0 | neg. | N.A. | |
| | 52 | 0.201 | TNTC | 0 | neg. | N.A. | x |
| | 53 | 0.065 | 0 | 0 | neg. | N.A. | |
| | 54 | 0.074 | 3 | 0 | neg. | N.A. | x |
| | 55 | 0.073 | 0 | 0 | neg. | N.A. | |
| | 56 | 0.061 | 0 | 0 | neg. | N.A. | |
| | 57 | 0.063 | 0 | 0 | neg. | N.A. | |
| | 58 | 0.073 | 0 | 0 | neg. | N.A. | |
| | 59 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 60 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 61 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 62 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 63 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 64 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 65 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 66 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 67 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 68 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 69 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 70 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 71 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 72 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 73 | N.A. | 1 | N.A. | neg. | N.A. | x |
| | 74 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 75 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 76 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 77 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 78 | N.A. | 23 | N.A. | neg. | N.A. | x |
| | 79 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 80 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 81 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 82 | N.A. | 0 | N.A. | neg. | N.A. | |

Appendix J. Continued.

| Sample date | Fish number | ELISA o.d. ^a | MFAT ^b | DFAT ^b | Virus | W.D. | Culled | |
|-------------|-------------|-------------------------|-------------------|-------------------|-------|------|--------|--|
| 11/10 | 83 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 84 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 85 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 86 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 87 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 88 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 89 | N.A. | 101 | N.A. | neg. | N.A. | x | |
| | 90 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 91 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 92 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 93 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 94 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 95 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 96 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 97 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 98 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 99 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 100 | N.A. | 0 | N.A. | neg. | N.A. | | |
| | 11/17 | (f)101 | 0.161 | 0 | 0 | neg. | neg. | |
| | | (f)102 | 0.141 | 0 | 0 | neg. | neg. | |
| 103 | | 0.084 | 0 | 0 | neg. | N.A. | | |
| 104 | | 0.073 | 0 | 0 | neg. | N.A. | | |
| 105 | | 0.068 | 0 | 0 | neg. | N.A. | | |
| 106 | | 0.072 | 0 | 0 | neg. | N.A. | | |
| 107 | | 0.073 | 0 | 0 | neg. | N.A. | | |
| 108 | | 0.099 | 0 | 0 | neg. | N.A. | | |
| 109 | | 0.090 | 0 | 0 | neg. | N.A. | | |
| 110 | | 0.065 | 0 | 0 | neg. | N.A. | | |
| 111 | | 0.074 | 0 | 0 | neg. | N.A. | | |
| 112 | | 0.074 | 0 | 0 | neg. | N.A. | | |
| 113 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 114 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 115 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 116 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 117 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 118 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 119 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 120 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 121 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 122 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 123 | | N.A. | 0 | N.A. | neg. | N.A. | | |
| 124 | | N.A. | 0 | N.A. | neg. | N.A. | | |

Appendix J. Continued.

| Sample date | Fish number | ELISA o.d. ^a | MFAT ^b | DFAT ^b | Virus | W.D. | Culled |
|-------------|-------------|-------------------------|-------------------|-------------------|-------|------|--------|
| 11/17 | 125 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 126 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 127 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 128 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 129 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 130 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 131 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 132 | N.A. | 1 | N.A. | neg. | N.A. | x |
| | 133 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 134 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 135 | N.A. | 1 | N.A. | neg. | N.A. | x |
| | 136 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 137 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 138 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 139 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 140 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 141 | N.A. | 1 | N.A. | neg. | N.A. | x |
| | 142 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 143 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 144 | N.A. | 0 | N.A. | neg. | N.A. | |
| 145 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 146 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 147 | N.A. | 2 | N.A. | neg. | N.A. | x | |
| 148 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 149 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 150 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 11/28 | (f)151 | 0.143 | 0 | 0 | neg. | neg. | |
| | (f)152 | 0.143 | 0 | 0 | neg. | neg. | |
| | 153 | 0.077 | 0 | 0 | neg. | N.A. | |
| | 154 | 0.067 | 0 | 0 | neg. | N.A. | |
| | 155 | 0.083 | 2 | 0 | neg. | N.A. | x |
| | 156 | 0.098 | 0 | 0 | neg. | N.A. | |
| | 157 | 0.108 | 0 | 0 | neg. | N.A. | |
| | 158 | 0.082 | 0 | 0 | neg. | N.A. | |
| | 159 | 0.588 | 0 | 0 | neg. | N.A. | x |
| | 160 | 0.085 | 16 | 0 | neg. | N.A. | x |
| | 161 | 0.073 | 0 | 0 | neg. | N.A. | |
| | 162 | 0.096 | 2 | 0 | neg. | N.A. | x |
| | 163 | N.A. | 1 | N.A. | neg. | N.A. | x |
| | 164 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 165 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 166 | N.A. | 0 | N.A. | neg. | N.A. | |

Appendix J. Continued.

| Sample date | Fish number | ELISA o.d. ^a | MFAT | DFAT ^b | Virus | W.D. | Culled |
|-------------|-------------|-------------------------|------|-------------------|-------|------|--------|
| 12/01 | 167 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 168 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 169 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 170 | N.A. | 9 | N.A. | neg. | N.A. | x |
| | 171 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 172 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 173 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 174 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 175 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 176 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 177 | N.A. | 1 | N.A. | neg. | N.A. | |
| | 178 | N.A. | TNTC | N.A. | neg. | N.A. | x |
| | 179 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 180 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 181 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 182 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 183 | N.A. | 0 | N.A. | neg. | N.A. | |
| | 12/14 | 184 | N.A. | 0 | N.A. | neg. | N.A. |
| 185 | | N.A. | 0 | N.A. | neg. | N.A. | |
| 186 | | N.A. | 0 | N.A. | neg. | N.A. | |
| 187 | | 0.098 | 0 | 0 | neg. | N.A. | |
| 188 | | 1.118 | 200 | 0 | neg. | N.A. | |
| 189 | | 0.124 | 0 | 0 | neg. | N.A. | |
| 190 | | 0.089 | 0 | 0 | neg. | N.A. | |
| 191 | | 0.086 | 0 | 0 | neg. | N.A. | |
| 192 | | 0.087 | 0 | 0 | neg. | N.A. | |
| 193 | | 0.081 | 0 | 0 | neg. | N.A. | |
| 194 | | 0.109 | 0 | 0 | neg. | N.A. | |
| 195 | | 0.132 | 0 | 0 | neg. | N.A. | |
| 196 | | 0.089 | 0 | 0 | neg. | N.A. | |
| 197 | | N.A. | 0 | N.A. | neg. | N.A. | |
| 198 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 199 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 200 | N.A. | 570 | N.A. | neg. | N.A. | x | |
| 201 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 202 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 203 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 204 | N.A. | 108 | N.A. | neg. | N.A. | x | |
| 205 | N.A. | 0 | N.A. | neg. | N.A. | | |
| 206 | N.A. | 84 | N.A. | neg. | N.A. | | |

^aOptical density

^bOrganisms per 30 fields

Appendix K. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery (Class C). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Brood | Henrys Lake | Cutthroat trout | 94-115 | - | - | | - | | | | | | | | | IX: Negative for pathogens; VIRO 0/150 FAT 0/300 |
| Brood | Henrys Lake | Cutthroat trout | 94-116 | - | - | | - | | | | | | | | | IX: Negative for pathogens; VIRO 0/75, FAT 0/155 |
| Brood | Henrys Lake | Cutthroat trout | 94-117 | - | - | | - | | | | | | | | | IX: Negative for pathogens; VIRO 0/150 FAT 0/300 |
| Brood | Henrys Lake | Cutthroat trout | 94-122 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/250 |
| Brood | Henrys Lake | Cutthroat trout | 94-123 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/250 |
| Brood | Henrys Lake | Cutthroat trout | 94-124 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/230 |
| Brood | Henrys Lake | Cutthroat trout | 94-142 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/150 |
| Brood | Henrys Lake | Cutthroat trout | 94-143 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/150 |
| Brood | Henrys Lake | Cutthroat trout | 94-144 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/150 |
| Brood | Henrys Lake | Cutthroat trout | 94-153 | - | - | | + | - | - | + | | - | - | | | IX: RS, CWD, BS; VIRO 0/20, WHD 0/25, CSH 0/20, ELISA 42/52 (41 low, 1 mod), <u>E. psychrophilus</u> 6/18 <u>Pseudomonas</u> m. 5/13 |

Appendix K. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Brood | Henrys Lake | Cutthroat trout | 94-201 | | | | + | | | | | | | | | IX: RS; FAT 2/30-low (5-fish pools) |
| Brood | Henrys Lake | Cutthroat trout | 94-202 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/145 |
| Brood | Henrys Lake | Cutthroat trout | 94-203 | | | | - | | | | | | | | | IX: Negative for RS; FAT 0/150 |
| Brood | Henrys Lake | Cutthroat trout | 94-204 | | | | + | | | | | | | | | IX: RS; FAT 1/30-low (5-fish pools) |
| Brood | Henrys Lake | Brook trout | 94-580 | - | - | | | | | | | | | | | IX: Negative for viruses; VIRO 0/20 |
| Brood | Henrys Lake | Brook trout | 94-590 | - | - | | | | | | | | | | | IX: Negative for viruses; VIRO 0/45 |
| Brood | Henrys Lake | Brook trout | 94-591 | - | - | | | | | | | | | | | IX: Negative for viruses; VIRO 0/55 |
| Brood | Henrys Lake | Brook trout | 94-592 | - | - | | + | - | - | - | | - | | | | IX: RS, Bacteremia (mixed); viro 0/50, DFAT 1/50, ELISA 1/10 (mod.); 5-fish pool contained the DFAT + fish), <u>Pseudomonas</u> , <u>Aeromonas</u> , and <u>Sphingomonas</u> species of bacteria isolated. |

Appendix L. Summary report of Eagle Fish Health Laboratory results for Kootenai Sturgeon Hatchery. January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | WSIV | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-----------------------|----------------|-----------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------------|
| 1993 | Kootenai ^a | White sturgeon | 94-023 | - | | | | | | | | | | | | DX: HISTO Negative for WSIV |
| 1993 | Kootenai ^a | White sturgeon | 94-070 | + | | | | | | | | | | | | DX: WSIV; HISTO + TEM confirmed |
| 1993 | Kootenai ^b | White sturgeon | 94-168 | - | | | | | | | | | | | | IX: HISTO Negative for WSIV |
| 1993 | Kootenai ^a | White sturgeon | 94-169 | - | | | | | | | | | | | | IX: HISTO Negative for WSIV |
| 1993 | Kootenai ^a | White sturgeon | 94-170 | + | | | | | | | | | | | | IX: WSIV; HISTO + |
| 1993 | Kootenai ^a | White sturgeon | 94-261 | + | | | | | | | | | | | | IX: WSIV; HISTO + |

^aFish transferred to Clear Springs Laboratory prior to sampling.

^bFish sampled at Kootenai Hatchery.

Appendix M. Summary report of Eagle Fish Health Laboratory results for Mackay Hatchery (Class A). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|--------------------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1993 | Plymouth Rock | Brown trout | 94-178 | - | - | | - | - | - | - | | | | | | IX: Negative for pathogens; VIRO 0/25, FAT 0/24, BACTE 0/4 |
| 1993 | Deadwood | Kokanee | 94-179 | - | - | | - | - | - | | | - | | | | IX: Negative for pathogens; VIRO 0/24, FAT 0/24, BACTE 0/4, WHD 0/20 |
| 1993 | Westslope (McCall) | Cutthroat trout | 94-189 | - | - | | - | - | - | - | | - | | | | IX: Negative for pathogens; VIRO 0/20, FAT 0/20, ELISA 0/20, BACTE 0/8, WHD 0/20 |
| 1993 | Arlee | Rainbow trout | 94-190 | - | - | | - | - | - | + | | - | | | | IX: CWD; VIRO 0/20 <u>E. psychrophilus</u> (light) 1/8; FAT 0/20 ELISA 0/20, WHD 0/20 |

Appendix N. Summary report of Eagle Fish Health Laboratory results for McCall Hatchery Resident Program (Class C). January 1 - December 31, 1994.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-----------|-----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Brood | Westslope | Cutthroat trout | 94-263 | - | - | | + | | | | | | | | | IX': RS; Viro 0/76 (tissue and OF), ELISA 27/30 (all low) |

Appendix O. Summary report of Eagle Fish Health Laboratory results for Nampa Hatchery (Class CI. January 1 - December 31, 1993.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|-------------|---------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1993 | Trout Lodge | Rainbow trout | 94-006 | - | - | | - | - | - | - | | | | | | DX: CWD; VIRO 0/10, ELISA 0/5, FAT 0/7 <u>Flexibacter psychrophilus</u> 2/10 |
| 1993 | Wolf Lodge | Fall Chinook | 94-007 | - | - | | | | | | | | | | | DX: Environmental stress |
| 1993 | Hayspur | Rainbow trout | 94-016 | - | - | | - | - | - | - | | | | | | DX: Bacteremia, Internal mycosis (secondary); VIRO 0/10 <u>Aeromonas hydrophila</u> 1/8, <u>Rhodotorula</u> (yeast) 1 /8 |
| 1993 | Manchester | Brown | 94-078 | - | - | | | - | - | - | | | | | | DX: MAS; VIRO 0/10 <u>A. hydrophila</u> 5/8 |
| 1993 | Wolf Lodge | Fall Chinook | 94-094 | | | | - | | | | | | | | | DX: Negative for pathogens; FAT 0/38 |
| 1993 | Wolf Lodge | Fall Chinook | 94-107 | - | - | | - | | | | | | | | | DX: MAS, BS; VIRO 0/10, FAT 0/10, ELISA 0/10, <u>Aeromonas hydrophila</u> 2/8, <u>Shewanella (Pseudomonas) putrefaciens</u> 5/8 |
| 1993 | Wolf Lodge | Fall Chinook | 94-125 | - | - | | - | - | - | - | | | | | | DX: MAS: <u>A. sobria</u> 2/4 <u>A. hydrophila</u> 1 /4 VIRO 0/5, FAT 0/5 |

Appendix O. Continued.

| Brood year | Stock | Species | Accession | IHN | IPN | EIBS | BKD | FUR | ERM | CWD | PKD | WHD | CSH | ICH | GBD | Diagnoses |
|------------|---------------|----------------|-----------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 1993 | Gerard | Kamloops trout | 94-160 | - | - | | + | - | - | + | | - | - | | | IX:RS, CWD; VIRO 0/60 ELISA 9/12 pools-low, <u>A. hydrophila</u> 3/32, <u>Pseudomonas</u> 2/32, <u>Flexibacter</u> sp. 2/8, CS 0/4, WHD 0/20, Lot destroyed--lack of Title 50 cert. |
| 1993 | Trout Lodge | Kamloops trout | 94-172 | - | - | | - | | | | | - | | | | IX: Negative for pathogens; VIRO 0/60, ELISA 0/60, WHD 0/20 |
| 1992 | Gloyd Springs | Kamloops trout | 94-382 | - | - | | - | - | - | - | | | | | | IX: Bacteremia; VIRO 0/59, ELISA 0/59 FA 0/60, <u>Aeromonas</u> species 2/16, <u>S. putrefaciens</u> 1/16 |
| 1994 | Hayspur | Rainbow trout | 94-417 | - | - | | | - | - | + | | | | | | IX: MAS, CWD; VIRO 0/15, CWD 5/12, <u>A. hydrophila</u> 5/12 |
| Brood | Deadwood | Kokanee salmon | 94-476 | - | - | | + | | | | | - | - | | | IX: RS; VIRO 0/60, ELISA 2/12 pools low, CS 0/20, WHD 0/20 |
| 1994 | Trout Lodge | Kamloops trout | 94-634 | - | - | | | - | - | - | | | | | | DX: Bacteremia, Mycotic infection; VIRO 0/8, Fungus 5/8, <u>Pseudomonas</u> 3/8 |
| 1994 | Trout Lodge | Kamloops trout | 94-635 | - | - | | | - | - | + | | | | | | DX: CWD; VIRO 0/10, <u>F. psychrophilus</u> 2/8 |

PATHOLOGY SPECIAL
FINAL REPORT

CLINIC NO.: PATHOLOGY NO.: 94A 2012
SPECIES: FISH DATE REQUESTED: AUG 4, 1994
BREED: STURGEON PATHOLOGIST: J. GROFF, VMD
SEX:
NAME: NO NAME
CLINICIAN: NO DOCTOR #
OWNER: CLEAR SPRINGS TROUT COMP. DR. SCOTT LA PATRA
ADDRESS: PO BOX 712
BUHL, ID 83316

SPECIMEN: BIOPSY TISSUE PRESERVATIVE: FORMALIN DATE REPORTED: AUG 24, 1994

PATHOLOGIC DIAGNOSIS: 1) NORMAL WHITE STURGEON
2) NO EVIDENCE OF WHITE STURGEON IRIDOVIRUS INFECTION

CLINICAL ABSTRACT:
Yearling Kootenai white sturgeon maintained at Clear Springs Research were submitted for histological examination. The fish were fixed in Bouin's solution and transferred to 70% methanol prior to processing.

GROSS DESCRIPTION:
Post fixed white sturgeon were considered grossly normal.

HISTOPATHOLOGICAL SUMMARY:
Sagittal sections of yearling white sturgeon were examined microscopically (T1-T9). The significant findings were as follows:
There was no evidence of white sturgeon iridovirus infection or other infectious diseases in these fish. There was dilatation of the gastric glands in two fish (T1, T4). There was also dilation of the proximal renal tubules in two fish (T2, T6). The splenic stroma was prominent in two fish (T4, T6) and was associated with a decreased prominence of splenic periarteriolar lymphoid sheaths in one fish (T4). There was also a mild condensation and atrophy of the hepatocytes in one fish (T5). These findings were not considered significant.

COMMENT:
There was no evidence of infectious disease, including white sturgeon iridovirus infection in these fish.

mjj



Appendix P. University of California Davis Pathology report for Kootenai River white sturgeon heal at Clear Springs Research Labs, Buhl Idaho.

Submitted by:

Gary Baker, Fish Hatchery Manager I
David Billman, Assistant Hatchery Manager
Todd Garlie, Fish Culturist
Mel Sadecki, Fish Hatchery Manager I
Bill Harryman, Assistant Hatchery Manager
Bradford W. Dredge, Fish Hatchery Manager I
Bruce Thompson, Assistant Hatchery Manager
John Thorpe, Fish Hatchery Manager II
Daniel Beers, Assistant Hatchery Manager
Scott Patterson, Assistant Hatchery Manager
Bob Turik, Fish Culturist
Robert Hill, Fish Hatchery Manager I
Kurtis Schilling, Assistant Hatchery Manager
Paul Martin, Fish Culturist
Joe Chapman, Fish Hatchery Manager II
Bob Esselman, Fish Hatchery Manager I
Doug Young, Assistant Hatchery Manager
Paul Dorman, Fish Culturist
John Siple, Assistant Hatchery Manager
Paul Anders, Fish Biologist, Kootenai Tribe of Idaho
Bill Doerr, Fish Hatchery Manager I
Robert Hoover, Assistant Hatchery Manager

Mel Hughes, Fish Culturist
Steven Kammeyer, Assistant Hatchery Manager
Mary Van Broeke, Biological Aide
Rick Alsager, Fish Hatchery Manager II
Dan Baker, Assistant Hatchery Manager
Rob Morris, Fish Culturist
Jeff Heindel, Biological Aide
Bill Stutz, Fish Culturist

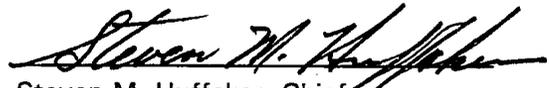
Compiled by:

Thomas S. Frew
Resident Hatchery Supervisor

Sherri Moedl
Word Processing Specialist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME


Steven M. Huffaker, Chief
Bureau of Fisheries


Bill Hutchinson
Fish Hatcheries Manager